COMPUTER WEEKLY

UK Series 1 users set up group

A USER group is about to be organised for the UK's small but rapidly growing community of IBM Series 1 users. The group is to hold its first meeting next week, as an "epilogue" to an IBM-organised meeting of representatives from Series 1 installations.

Instrumental in the organisation of the group have been CAP and Altergo, two of the first software houses to take an interest in the Series 1 machine. Dr Gill Ringland, project manager for Series 1 developments at CAP, in particular, has been chief moving spirit of the group.

News of the UK Series 1 group comes as an already organised group of US users are putting pressure on IBM to provide more ready-made software for the machine.

Suggestions from this group include multi-terminal RJE support, compilers, particularly Cobol and a database management system. On the hardware side, a need has been expressed for an increase in memory size, more disc-handling capability and a nine-track interface.

Requests for IBM-initiated software enhancements strengthen the move away from IBM's initial policy, that the machine should be provided with minimal software, and that independent software houses and users should be relied upon to provide the remainder.

IBM has already begun to drift away from this path, with announcement of sophisticated operating systems software and Fortran and PL/1 compilers, and reported development of a Cobol compiler (CW, April 21 and September 8).

Software houses in the UK and the US have already produced a variety of Series 1 products, but some admit that they are holding back on certain developments, and waiting to see what IBM produces.

Dr Gill Ringland ... chief moving spirit.

NCC initiative fails to end service industry worries

EXPORTS of UK computing services received a boost from the National Computing Centre following the decisions to give extra support to the 123 members in this sector and to appoint a services industry membership manager.

But while welcoming the NCC's initiative, the service industry is still concerned about competition from the centre, especially now that its funding has been changed from an annual government grant to contracts for individual projects.

The NCC's services industry membership manager is Eric Bird, who has been at the centre for five years. He will act as a contact point for the software products scheme, for requests from overseas for training services and for the Interlock programming services scheme, under which contractors develop systems in the UK to the specifications of an overseas customer (CW, June 9).

Bird is in the US this week testing reactions to the interlock scheme and looking for US agents. He said Interlock had the biggest immediate potential although in the long term the developing countries would be a "fantastic" market for training services.

"Our aim is to use the NCC as a marketing agent for computer services," he said. "We hope to promote the UK as the natural home of training work. We can use the reputation of the NCC and that of the services industry, Both are very good overseas."

Bird said the NCC would be working very closely both with the Computing Services Association, which is running its own export scheme and with Insac Data Systems, the National Enterprise Board's services exporting company. The contact here would be through Anthony Chandor, who has joined Insac from the NCC.

Alan Benjamin, director-general of the CSA, welcomed the NCC's moves but said the problem of competition with service companies was still there.

"It's inevitable, given the NCC's new method of funding," he said, but he believed that there was no reason why the government contracts to the NCC should not have gone to service companies.

He added that the CSA was still negotiating with the NCC on the level of competition and that the CSA hoped to contain that competition.

State half stake in Svenska Data

UNDER the revised plan for restructuring the Swedish computer industry, Stansaab effectively takes over Datasaab, and the resulting company is to be called Svenska Data. The managing director-elect is the present head of Stansaab, Gunnar Wedell.

The plan will be put before Swedish Parliament shortly, and the new company will be formed on January 1.

"It is 100% certain to be passed by Parliament," Wedell told Computer Weekly.

Datasaab is at present a subsidiary of Saab-Scania, while Stansaab, a former ITT company, is now owned 50% by Saab-Scania and 50% by the State Investment Bank. Svenska Data will be owned equally by Saab-Scania and the State.

The plan includes a major investment of government money in the new company.

Datasaab's main interests are banking terminal and small business systems. Stansaab builds air traffic control and hospital automation systems and Alfaskop display terminals.

Stansaab's major air traffic control contract with the Soviet Union has been held up by delays in the approval for export of US components (CW August 11). Wedell declined to comment on Swedish Press reports that the components had now been released.

Systime to support X-25

RECOGNISING the importance of packet switching and the need for a standard in the area, Systime has decided to produce equipment to handle the X-25 virtual call communications protocol. But the company has plans for its own versatile protocols.

X-25 has been defined by international communications committee CCITT, and is in the process of ratification by the International Standards Organisation.

Detailed specification of the UK Post Office's implementation of the protocol is necessary before the Systime work can proceed, but the first equipment to be produced will probably be an intelligent communications controller to handle ISO's HDLC line protocol, on which X-25 is based.

Systime recognises that packet-switching is chiefly suitable for large networks, and within the next year, it will begin to design its own byte-oriented protocols, designed to accommodate synchronous, asynchronous or parallel transmission, with relatively inexpensive equipment.

Following Systime's recruitment to Insac (CW, June 23), Stephen Dawson, of the NEB, has been appointed to the Systime board. Systime's first export ventures will continue existing plans in Europe, but a venture into the US will possibly be made later.

CAP sets up base in Silicon Gulch

AS the NEB's Insac moves into the US through a New York office (CW, September 22), the consortium's first member, CAP, has set up its own venture on the other side of the country, in Palo Alto, California.

Known as CAP-CPP Inc, the company, opening this week, will deal in CAP Microsoft products and services. CAP's venture will have more experience than most microprocessor software specialists currently in the US, claims CAP director Meinhard Donker. The company wishes to get established quickly while this lead still exists.

It is also felt to be an advantage to base the venture in the California centre of the US semiconductor industry, popularly known as Silicon Gulch.

Despite the independence of its plan, CAP stressed that this did not imply any disagreement with Insac. The deal has the approval of the full CAP board.

Carterfone bid by C & W

THE UK government Cable and Wireless company bidding $16.3 million for Carterfone Communications Corp of Dallas, Texas. Carterfone makes office data communications equipment, and is celebrated for an anti-trust victory against AT&T in the late 1960s as a result of which equipment from non-AT&T suppliers was allowed to be attached to AT&T lines for the first time.

IBM's China date

VISIT to China is planned for top IBM management within the next few days. IBM has been eyeing the Chinese market for banking systems and it has been encouraged following statements by top Chinese officials on the need to buy Western technology (CW, September 22).

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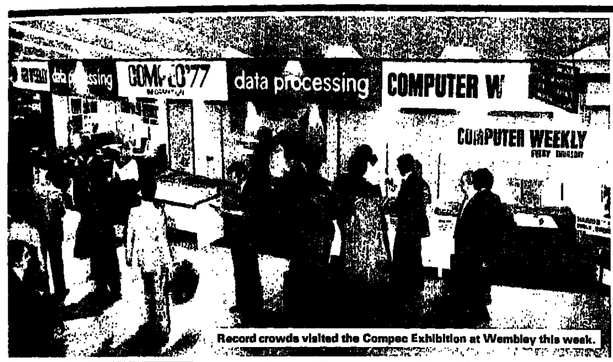

Record crowds visited the Compec Exhibition at Wembley this week.

Visitors flock to Compec

WHATEVER their interests, visitors who packed into Compec 77 at Wembley this week were sure to find something to attract their attention.

Among the dozens of companies which used the show to unveil their latest products was Digital Equipment with the LSI-11/2, its latest microprocessor system. This provided a dramatic illustration of how advances in semiconductor technology are making processor and memory costs a relatively trivial consideration for systems builders.

On the first day of the show Dicoll, systems builder of Basingstoke, ordered 100 LSI-11/2s for sale to end users and for building into equipment which it is developing.

Meanwhile, some of DEC's competitors, such as Prime, Data General, and General Automation, showed that software is the name of the game, by demonstrating the capabilities of their latest high level language and operating system creations.

With most processors tucked away in anonymous-looking boxes, peripherals and terminals again dominated the hardware on show. New kit being demonstrated included Texas Instruments' 765 bubble memory terminal; Calcomp's IGT 100 graphics display; and Dataproducts' three new printer families which were getting their first public showing.

On the Documation stand there were demonstrations of what is claimed to be the fastest line printer available, the IBM-compatible DOC 2250, and, at the other end of the scale, was the 30chps Teletype Model 43, shown by Teleprinter Equipment.

To meet the challenge of the 43, Extel, which sells the DECwriter LA 36, announced a price cut of £155 for this terminal to £965 for single units.

Briefing

Top of line

THE machine now being put together to top Honeywell's Level 68 line will be substantially different from the originally-announced 66/85 which was hit by problems with the CPU chips (CW, November 3). As well as new CPU chips, the machine will feature system control units altered from those originally announced.

Russian vote

EUROPEAN representative of the ACM, Bob Parslow, was one of two ACM council members who voted last month at an ACM council meeting in Seattle against a resolution stating that the ACM would not co-operate with or co-sponsor any meeting to be held in Russia and to "question at the appropriate time" any other international activities involving Russian computer scientists. The resolution was in protest against the detention of Russian computer man Anatoly Shcharansky. (See Computerview, page 2).

Carter embargo

ALTHOUGH the United Nations resolution on the South African arms embargo does not explicitly mention military computers, a White House spokesman told Computer Weekly that computers would be considered by President Carter as part of his discussions when drawing up details of the embargo.

IBM bytes words

THE forthcoming IBM 3032 mainframe replacement for the 370/168 will not after all feature 4K-bit memory chips, but use 2K chips like the 3033 and 3031. At the product launch, IBM explained that availability of 4K chips meant that only one of the three new machines could use them and that the 3032 was chosen for reasons of marketing forecasts, power consumption and packaging (CW, October 13). IBM now says that there was never any intention to use 4K chips.

3031 draw 'winner'

LUCK of the draw has made Derbyshire County Council one of the first customers for the IBM 3031 which is to replace its 370/145. The 3031 was designed as a replacement for the 370/168 (CW, October 13) and IBM has "randomised" the orders to schedule deliveries.

Launch of ICL mid range 2950

THE ICL 2950 mid-range system was officially announced this week. It was previously known as the S1.

Costing between £300,000 and £600,000, it runs under two operating environments — the 2900 series VME/K operating system or DME/3, which emulates a small 1900 or 2903/2804 environment. Database management capabilities are provided by the IDMS system.

Hardware innovations include a new 80 Megabytes exchangeable disc store and the first peripheral series from Computer Peripherals Inc, for the 2900 series — a 720 lpm band printer with 132 print positions, which is manufactured in the US. The hardware also includes automatic error detection and correction facilities.

Five machines have already been installed for development work, including one at ICL's European sales centre in Paris and one at the Edinburgh Regional Computing Organisation, which already has a 2980 and has been closely linked with 2900 software development.

The 2950 will be manufactured in the UK at Kidsgrove and Winsford. First deliveries are scheduled for spring 1978.

Varsity market moves to minis

By John Kavanagh

A SERIOUS challenge to dominance of the British university market by mainframe manufacturers, particularly ICL, is being mounted by minicomputer suppliers.

Government spending cuts and the ability of modern minicomputers to meet universities' demands for interactive computing have given big contracts to Prime and GEC, and other £250,000-plus contracts are on the way.

Prime has won its biggest European order from Loughborough University, which is to get two Prime 400 minicomputers worth a total of £262,000; Keele University looks set to replace its old 4130 by a GEC 4080; and Birmingham expects to install a minicomputer system worth more than £250,000 by the end of next year.

And the Department of Education and Science's Computer Board, which controls the money for university computing, has suggested to other universities that in these hard financial times they should consider minicomputers for interactive computing rather than hope to replace their ageing mainframes by more powerful and more expensive ones which can handle both interactive work and number crunching.

The board's policy reflects general government fears that it might not be able to afford to replace old computers in government installations.

The Computer Board's policy has upset at least two universities which wanted a machine of the power of an ICL 2960 but which were allocated no more than about £300,000 by the board.

The 2950, launched this week, starts at about that price for a minimum configuration.

Another university source said that if one minicomputer system was installed now to handle interactive computing another could eventually take over the batch load currently handled by a mainframe, thus shutting out the mainframe manufacturers completely. This is already happening at London's University College, which is replacing an IBM 360 by an as yet undefined number of GEC 4080s (CW, August 4).

John Harris, manager of ICL's education region, said that he expected to lose some business if a university wanted a small interactive machine which was not of a general purpose nature, but that at the same time the Computer Board was planning more powerful regional centres, a market in which ICL was very strong.

He added that ICL was also very strong in other parts of the education market such as those

● Turn to page 3

Now Amdahl jnr aims at IBM 370s

TWO FORMER Amdahl employees, with Gene Amdahl's son, have set up a new company providing plug-compatible CPUs for IBM systems.

Called Magnuson Systems Corp and based in Santa Clara, California, the firm is aiming primarily at the low end of the IBM 370 series, from the 115 to the 148. Amdahl has concentrated on the larger systems.

Magnuson is manufacturing its own PC boards using standard chips from National Semiconductor and Texas Instruments.

Joe Hitt, marketing vice-president of Magnuson, told Computer Weekly, "Our machines will be 110% IBM compatible. IBM software will be able to run on them with no changes."

Hitt said that Magnuson will handle its own marketing and maintenance in the US, and is

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COMPUTERVIEW

Variety is not the spice of operating system life

THIS week ICL has introduced the 2950 (front page). More precisely, it has introduced a medium-size system running under the VME/K operating system.

Users of the ICL 2900 series cannot complain of lack of variety in operating systems. There are the (for the present) 24-bit 1900 look-alike soft machine 2903 and 2904 with their 1900-style operating systems; there are VME/B and VME/K for the byte-structured medium and big systems. Not to mention the DME system which makes the 2950 and above run just like, say, a 1900 George environment. And there are the Meep emulators which enable a 2900 system to run in two modes, say VME/B and System 4J.

According to ICL's marketing words of wisdom, this variety enables the user to select the system suited to an installation's particular needs.

Meanwhile, the 1900, 2903/4 and System 4 users can use a DME emulator to run their systems on 2900 hardware.

From a user point of view, however, variety is not necessarily the spice of DP life.

Whatever ICL's brave marketing words might say, the reason for having B and K is a result of internal political and design battles that have been going on within ICL ever since Ed Mack took over the company's product development in 1972.

He decided, not unnaturally, that he preferred his own design strategy to the approach he found being implemented in B and supervisor D, which would have been the TP oriented version of B.

This political design in-fighting was described in Computerview on April 21.

It involves, for example, those who would like a mini-B to extend down the range as well as those who want K to extend up the range.

Whatever the merits of each side's case, there is no doubt that both B and K, in their initial versions, failed to reach acceptable levels of useability.

And even if K is essentially the same design as Ed Mack's work for Univac in the early sixties, it is small comfort to a user such as Kent University which had held up the introduction of its VME/K-based user service for six months due to inadequacies in the available VME/K K release.

As was clearly stated at the last meeting of the 2900 Club (CW, October 27), users of both B and K think the systems are now improving rapidly but are highly critical of some of the earlier releases and of the current state of the communications capabilities on both systems.

This is a damning criticism of a range of systems which, when conceived in the late 1960s, had communications and TP capabilities as its highest priorities and which started by using the Cades software engineering system supposedly to produce new operating systems that would be more useable and more reliable than possible before.

It is difficult to quantify precisely how much of the delays in the operating systems coming to maturity can be blamed on the design in-fighting between B and K; on the way Emmanuel Ypsilante (now back at Univac) was supported by Mack a few years ago with his System T against the wishes of some of the old software development establishment; on the traumatic conversion of T into K and the knowledge among the B people that Mack would most probably have killed B completely if he had come to the company earlier, even if he now accepts it.

The financial success that Geoff Cross has brought to ICL will have its most testing time over the next year, particularly at the big end of the range, where ICL has made no real answer to the IBM 3030 series; and in the middle range where the 2950 has come not a moment too soon (and at least two years after ICL first started talking to users about 2950, although that was a different machine from this week's version).

In the small systems field, ICL has a strong base in the 2903 and Singer Systems.

But a great deal depends on ICL sorting out its development of B and K to provide a strong base of positive user experience.

CW supports Parslow

IT was a brave decision by Bob Parslow, European representative of the ACM, to oppose the ACM council's decision to ban contact with Soviet computer scientists in protest against the treatment of Anatoly Shcheransky (front page).

As indicated at a meeting held at IFIP in Toronto, in August, the North Americans tend to believe that if you are not for their action you must be against it.

Anyone at that meeting, raising even a mildly liberal question about whether the proposed action was the most effective way of helping Schcharansky was treated as an enemy of the cause; possibly even a fellow-travelling leftist traitor.

In his writings, president of the ACM, Herb Grosch, is, however, liberal with his personal abuse against Russian scientists and Western doubters who suggest that the result could be increasingly bitter relations in the international computer community, which could harm rather than solve such cases.

It is very easy to be self righteous, difficult to be objective, in order to balance the needs for action in support of one man against the long-term improvement of all man.

Computer Weekly wholeheartedly supports Bob Parslow in standing firm in supporting the European view of balance and commitment.

Ten years ago...

COMPUTER WEEKLY NOVEMBER 9, 1967

AMBITIOUS plans for Plessey to become a major factor in the UK's computer industry ran into trouble when the XL12 in production snags . . . The National Provincial Bank ordered a second Burroughs B8500 . . . An SCR grant of £222,000 was given to the Machine Intelligence Department of Edinburgh University to upgrade an Elliott 4120 . . . Also in Edinburgh, at the Western General Hospital, an Elliott 903 was used for an online ECG project . . . The "technological gap" between Europe and the US was the subject of an OEEC survey . . . A mass storage system, based on high resolution film, was developed by IBM for the US atomic energy authority . . . Peking Radio announced the production of a transistorised computer . . . Lead distribution calculations for the new London Bridge were performed on the Manchester Atlas.

FOCUS

Communicating with the machine

BLAMING the computer — as a national pastime — seems at last to be giving way. Taking over in the blame stakes is "lack of communication."

It is becoming customary to bracket DP management in the same league as Trappist Monks or Harpo Marx, when it comes to communicating with the world outside DP.

Certainly it does seem that the natural aggressiveness of DP management is somewhat diluted outside the installation.

In their own environment, DP management are not noted for withholding apt comment — Basic or otherwise — when dealing with a recalcitrant engineer or the indifferent timekeeping of the data prep team.

Communications in the DP zone are seldom well structured. Messages are relayed by scribbled punch-cards.

DP teams however are now finding themselves increasingly isolated at the crossroads. Intersecting their normal activities are the twin pressures of technology advances and growing user power.

It is, however, not only DPMs who are at a loss. Many of the leaders of the DP industry are similarly puzzled.

David Firnberg, director of the NCC, suggests in the current NCC Newsletter that he has never known a time of greater uncertainty in the computing community. Many people, he comments, have lost their way. Relationships are being redefined.

DP management have little doubt who will be called on to do any necessary redefining. It will be the DPM who will take not only the blame for any failures in the communication channels, but will have to take the strain for subsequent user aggro.

Fortunately, respite is at hand. Computer Weekly and the DPMA have joined forces with Communication Audit to present next month, a DP/User communication workshop.

Backing all this activity, the DPMA has organised a related industry survey, hopefully to establish and define shortcomings in existing communication procedures.

Focus could well have saved them the trouble. Particularly the question asking "what is the biggest single obstacle to successful user communication?"

Suggestions include:

- Lack of golfing prowess handicaps close relationships with senior company and user management;
- Misinformed articles in management publications which suggest that a new processing machine can replace all existing computing equipment; and
- The general inability of user departments to appreciate the timescales of new project implementation — despite many years' experience.

The CW/DPMA workshop should take the opportunity of ensuring that those present get on the message to the end user. Namely, that existing application concepts, where the computer undertakes all levels of requirements, have been distributed along with the mainframe. Now it could well be the application which has to accommodate the machine.

INTERRUPT...

ONCE upon a time, there was an operator who played practical jokes. Which is equivalent to a surgeon with the DTs or a china shop with a bull as its mascot.

Most of his jokes were pretty harmless. Then one night he decided to set the night shift a little initiative test.

Before handing over to them, he put down a switch on the ops console that closed off a complete mag tape channel — and he covered the switch with a card tray and loosened the warning light bulb.

He thought the fault would be discovered in a trice. But it wasn't.

Thinking there was a genuine fault, the operators called the resident engineer (this was in the far off days when there were such beings).

Being new to the job and keen, the engineer spent hours trying to solve this obscure fault.

Eventually the shift leader told him to call it a day (or a night) and they called in a support engineer — who found the "fault" immediately.

Unfortunately, the resident engineer had been so enthusiastic in his search for a problem that he had caused a large number of new faults in the mag tape controller. It was many hours into the next morning before the system went live again.

The moral: There are many jokers in the DP business. And some of them just ain't funny.

● Submitted by R. G. Stevenson of Amersham, Bucks, who wins the weekly £5 interrupt prize.

EMIscanner now detects horses' ailments

THE EMIscanner can now be used in the veterinary field, specifically to detect horses' ailments. Previously, the machine has been used solely in the diagnosis of human diseases, particularly cancer; but research at EMI's Central Research Laboratories, where a scanner has been used to examine a horse's limbs, head and neck, has shown that it can also assist in identifying equine disorders.

"Wobbling" (cervical stenosis), tongue swallowing, gurgling and laryngeal paralysis are some of the diseases where diagnosis could be aided by scanning, as well as in X-raying the hoof, which is notoriously difficult by conventional methods.

The scanner (CW, October 20) uses X-rays and a Data General Eclipse mini to construct a point-by-point image of a cross-section of the body. The image produced is superior to that obtained by standard X-ray methods, because of the elimination of unnecessary information (an ordinary X-ray picture is a 3-dimensional image expressed in a 2-dimensional medium) and of the better resolution which is given: the computer records more information than can be registered by a black-and-white image at one time, but all the information can be accessed.

Manual for Interlock—

THE scheme to export UK software development services under the aegis of the National Computing Centre has begun in earnest with the completion of the control manual for the NCC's Interlock service and a trip by NCC representatives to the US, the initial market area for the service.

Interlock (CW, June 9), aims to direct work for overseas clients to UK consultancies. The work will be done in the UK. The 250-page manual defines appropriate procedures, stressing specification of clients' requirements.

Following Anthony Chandor's move from the NCC to the NEB (CW, September 23), the interlock project is now being supervised by the NCC's Eric Bird. He and colleague Fred Ford are negotiating an agency to handle the US end of the business, as well as talking to prospective clients.

● Our picture shows Robin Williamson (left) of Data Logic, who co-ordinated the writing of the manual, handing it over to Eric Bird.

Strike threatens Telex calls

INTERNATIONAL Telex calls are threatened with disruption following a strike by members of the London City Branch of the Post Office Engineering Union who maintain the Plessey 4660 and other telex switching systems at St Botolphs Exchange, Houndsditch.

The dispute arose when 28 POEU members at the exchange stopped normal working in sympathy with colleagues at another exchange who were claiming a "dirt and discomfort" bonus of 10% while building work is in progress. The claim was turned down by the Post Office.

"The 28 men were asked to resume normal working and when they refused they were sent home without pay. Then a strike was called," said a union spokesman.

The equipment maintained includes a duplicated twin-processor Plessey 4660 system, and a configuration of four General Automation SPC 16/85 mini-computers.

The exchange handles 75% of all international telex calls, about 750,000 messages a week.

ICL workers appeal

A NUMBER of workers at ICL's West Gorton plant, Manchester, have appealed against their sackings by the company, after a "detailed investigation" disclosed "irregularities" in their obtaining about £18,000 through expense claims (CW, October 27).

About 80 workers were dismissed for the alleged offences, and those that have appealed are being interviewed by senior ICL management at West Gorton.

Series 1 users pool their ideas

THE still fluid state of software for the IBM Series 1 has had a great influence on plans for the UK Series 1 user group (CW, November 3) which had its first meeting in London last Tuesday. Owing to the state of software development, initial meetings are to concentrate on verbal exchanges of software experiences, rather than written papers and formal presentations.

The group is likely to be officially constituted as a sub-group of the IBM Computer Users' Association, subject to CUA approval. It was felt that connection with an existing group would give the Series 1 users more force.

There was also the chance that if a Series 1 group did not exist within the CUA, the latter would decide to set up one of its own, thus duplicating effort.

The relatively small proportion of manufacturer-supplied software for the machine also makes interchange between users vital. A large number of software houses are involved in Series 1 work as a consequence of this shortage, and it was feared that these would be less willing to exchange ideas with their competitors.

The three software houses present acknowledged this difficulty, but thought that they could still give valuable help to other members without divulging market plans.

Users were particularly concerned to exchange information on IBM's Real Time Programming System at subsequent meetings. Users are only now beginning to implement this software, and there has been some trouble with the initial versions.

Seven users or prospective users of Series 1 were represented at the meeting, including software houses CAP, Altergo and Software Architects. The next meeting, early in the new year, will probably be the first annual meeting of the group, at which officers will be elected.

IBM was also represented, by Alan Sanders, from the company's Birmingham office, one of its two main centres of Series 1 expertise in the UK.

Sanders indicated that IBM would be happy to attend future user meetings, but also happy to withdraw if users wished to hold a closed session.

Year's free use of ICL 1500

A YEAR'S free use of a 1500 computer is being offered by ICL as a prize in the £75,000 Sunday Times Small Business Award. ICL is confident that at the end of the year the computer will have proved itself so useful that the winner will either buy it or rent it.

Entrants to the award competition have to detail a three year plan and describe their products, markets, management experience and investment. Closing date for entries is November 30.

Full details can be had from: Small Business Capital Fund, 88 Baker Street, London W1. Tel: 01-486 5021, extension 5.

Universities move to minis

● From front page

colleges which wanted small general purpose computers, where the 2903 was doing very well.

The Prime 400s at Loughborough University will both have 768K of memory and two 80 Megabyte disc drives. The machines will join the university's ICL 1904S and support 64 terminals simultaneously.

Birmingham is also an ICL user, having a 1906A. Its minicomputer system will serve Aston and Warwick universities. Birmingham expects that it will always need a mainframe for batch processing as it has some big databases and some scientific users.

Amdahl Jnr aims at 370s

■ From front page

currently talking to prospective distributors in Europe although no date has been set for a European debut.

In the US Magnuson hopes to unveil the machines in January next year, and already has a prototype model running at its Clara, California plant.

Although Magnuson is concentrating on the low end of the 370 range, the firm intends to bring out machines that match the recently announced 3031 and 3032, but it does not plan to challenge the 3033.

Joe Hitt was formerly marketing vice-president of Raytheon Cossor Data Systems.

DOWNTIME

By Chief

Showing the flag, barefoot style . . .

Best foot forward

NEW horizons in sport sponsorship were reached last month when Wilcox Computers organised a barefoot water skiing competition on a 50-acre lake owned by one of the company's salesmen.

For the uninitiated, this sport entails being pulled barefoot across the water by a boat at 40 miles an hour.

Norman Wilcox, owner of Wilcox Computers, presented the trophies for slalom, tricks, start methods, endurance and overall champion. An outsider, Brian Harris, won all the trophies but one. In the endurance competition he survived for almost five minutes.

Given that Wilcox specialises in microcomputer systems, there must have been a lot of fried sole and chips around that lake.

Easier said than done

A MANAGER of a skateboard emporium told a newspaper last week that there was no danger in skateboarders constructing their boards from kits. "It's as easy as putting a battery in a computer," he said. If he'll show me how to put a battery in a 370/158, I'll believe him.

On second thoughts, perhaps his only experience of computers has been with battery-driven portable micros. What's a skateboard man doing looking at these?

Going for a RAM on the PROM . . . See above.

The art of looking solid

A DOCUMENT received last week from the marketer of a graphics package instructs us how to make objects look solid on a two-dimensional visual display.

After explaining perspective and the technique of eliminating edges and surfaces that would be hidden from the eye on the real object, it arrives at a reasonable representation of a cube.

Then it comes on to "context". If a few spots are added on the faces of the cube, "it becomes even more cubelike".

This says a great deal for the context in which CAD men normally see cubes. Either they are Monopoly players, or they spend their time in gambling dens.

French Antiope system could handle Viewdata

A French information system, Antiope, has been developed which is broadly compatible with Viewdata, though not with Teletext. Combining the principles of both UK systems, it could mean that Viewdata is likely to be much the more important service. TIM PALMER describes the French system and its implications.

TWO British information systems, Teletext and Viewdata, have received widespread publicity, but few people outside France have heard of an alternative French system, Antiope, which combines the principles of both British systems and is incompatible with Teletext but broadly compatible with Viewdata.

Teletext is the reception by a television receiver of broadcast textual and graphic information; two UK services are already in operation, the BBC's Ceefax and the IBA's Oracle.

Viewdata is the transmission of data over telephone lines either to an adapted domestic television receiver or a purpose-built terminal. The British Post Office plans an experimental Viewdata trial in 1,000 selected homes starting next summer.

The key feature of UK Teletext is that it has been designed to be marketed fairly quickly and cheaply, which means that it is fairly limited in the graphic and alphabetical data which can be transmitted. However the circuitry needed to adapt a TV set to receive it is fairly simple.

Antiope, on the other hand, has been designed as a comprehensive data and graphic transmission facility for both broadcast and point-to-point dissemination. The flexibility it offers over UK Teletext includes a free-form data structure, which permits any alphabet or character set to be used, where Teletext is confined to 96 predetermined characters (although these can be adapted for use in countries where alphabets differ from the one used in the UK).

The UK Teletext standard includes a predetermined line length and frame structure, all the data for which is transmitted with the textual signal. This confines it to a 625-line standard and UHF transmission, but at the same time greatly simplifies (and hence economises on) the additional decoding circuitry required in a standard TV set.

Antiope Teletext on the other hand is independent of the line standard and the data is structured into packets similar to those used in a packet-switched data network. It is also designed to use the whole, or any part, of the television raster, rather than two specific blanking lines.

The French envisage using blanking lines during the normal programme transmission periods, unused lines when only a test card is being transmitted, and the full TV raster when all picture transmission is closed down.

The Antiope packets consist of eight bytes of header followed by up to 32 bytes of text. The header consists of a clock run-in, a framing code byte, a three-byte sender's address, a continuity index for successive packets from the same sender and a fill-in index of the packet.

The use of a packet format means that Antiope could be offered as one of the services on the planned French national Transpac packet-switched data network which begins service next summer.

The greatly enhanced flexibility of the Antiope system, both in its equal application to broadcast line transmission and in the facilities available to the editor who enters information into system, is offset by the much greater complexity of the decoding equipment needed to be incorporated into the receiver. Where the UK Teletext standard requires only six circuits, with an additional circuit and a solid-state modem to add Viewdata capability, Antiope requires 20 circuits, five of them needing to be specially designed in large-scale integrated circuitry.

The integrated circuits are so complex, and the forecasts for the market are so uncertain, that there are some doubts about the willingness of semiconductor manufacturers to put Antiope circuits into production. The development is several years behind that for both UK Teletext and Viewdata, in that the decoder and chip sets for Teletext first appeared last year, whereas France is hoping to have the first Antiope chip sets available in the summer of 1979.

The conflict between British and French [illegible] not perhaps as serious as [illegible] pears, for although a [illegible] data receiver cannot display an Antiope [illegible] Antiope receiver can [illegible] simpler Viewdata.

This means that two [illegible] standard could be [illegible] ternationally for transfrontier data via telephone to [illegible] without everybody being [illegible] to go for the much more [illegible] sive Antiope. It does not get over the incompatibility between UK Teletext and [illegible] Antiope, but Viewdata is [illegible] future likely to become the more important service.

Antiope, which stands for l'Acquisition Numérique et Visualisation d'Images Synthétisées en Pages d'Ecriture, developed by the French [illegible] organisation, the joint centre for research into television, telecommunication (not to be confused with CCITT). It is run by the French PTT and TDF broadcasting authority.

Another, much more [illegible] system has been developed by the French PTT on its own, called Tictac. It is a low-cost Viewdata system designed to link the telephone to an adapted black and white television receiver, with the signal being picked up from the aerial socket (Computer Weekly, September 29).

French move will not affect Honeywell's Scottish plant

THE decision by CII/Honeywell Bull to manufacture large-scale Level 66 machines in France will not have any impact on the future of Honeywell's Scottish plant at Newhouse, according to Russ Henderson, managing director of the UK company.

The move by the French company to build Level 66 systems at Angers has been long expected and deliveries from that plant are due to start next August. Henderson said the changes had been taken into account and Newhouse manufacturing levels would be maintained for five years at least, under the company's planning cycle.

The company is confident that output will be taken up by expanding sales in the UK and Ireland, and in supplying Italy and the Middle East countries serviced by Honeywell Italia. These include Yugoslavia, Israel, Turkey and Iran.

It has been said that IBM users in Europe are less keen than their US counterparts when it comes to choosing a plug compatible alternative to IBM.

A classic example of a US user with an independent spirit is the Pacific Mutual Life Insurance Company of Newport Beach, California. This firm has had plug compatible peripherals since 1969 and early this year became the first user anywhere to take its DP workload off its IBM processor and entrust it to an IBM compatible Advanced System from Itel.

Pacific Mutual's vice-president of information services, Kenneth Garrison (pictured right) spoke to Computer Weekly about why his firm decided to take the plunge, how the Itel machine is shaping up compared with the 370/155 it replaced and how Pacific Mutual became the first Advanced System customer almost by accident.

This is his story, in his own words . . .

Smooth run for first Itel Advanced System user

"EARLY last year we were considering several alternative ways of replacing our overloaded 155 with a more powerful machine. We thought of adding a second 155, or substituting a 158 or a 165, and even considered slicing up the workload with minicomputers. At one stage we talked to the Amdahl Corp about the possibility of their producing a smaller version of the 470/V6 for us. This was before the announcement of the V5. But Amdahl was only prepared to consider stripping down a V6.

"The three major factors affecting our decision were cost, power and technology, the latter being mainly operating system currency. A second 155 was the cheapest alternative but scored badly on power and technology, while a 158 was too expensive for the increase in power it offered, even though it would have kept us in touch with the latest operating system developments.

"In the end we opted for a 165, despite the operating system currency problems, mainly because it provided about three times the power of the 155 for the acceptable price of around $2½ million.

"We agreed to meet with a Chicago firm on Wednesday, May 5 last year to sign a contract for a 165, but on the Friday before, April 30, an Itel salesman called on us to discuss the Advanced System. This was well before it was officially announced and we knew nothing about it.

"Our middle management was sufficiently impressed with what Itel had to say that we made an appointment to see Itel's top men on the Sunday to discuss compatibility. The only reason we made it Sunday instead of Saturday was that my only daughter was getting married on the Saturday, and I'm not that devoted to my job!

"After working right through to Monday morning with Itel we caught a plane to San Francisco to see National Semiconductor, the firm that builds the Advanced System. By then we were sufficiently convinced that Itel had something good to offer that we cancelled the flight to Chicago.

"The AS/5 system we were interested in satisfied all three of our requirements. It was as powerful as a 158 but considerably cheaper, and provided the same operating system currency.

"Itel agreed to deliver the AS/5 by March this year and guaranteed to supply us with a suitable 370 machine if it was unable to meet that deadline.

"After rigorous tests to check out its components, including a session of 30 consecutive power drops during which the machine was put into full production mode after every fifth drop, the AS/5 was delivered on time in mid-March. The machine was made available to us at 11.30 on the morning it was delivered.

"For the first two weeks we ran a few hours of live program testing on it each day. It then became our exclusive program test machine. By mid-April we were sufficiently happy with its performance to transfer all our production work to the Itel processor and pulled all the peripherals off the 155.

"Before finally accepting the AS/5 we insisted that it should run with a CPU/memory/channel availability of 97.5% for 30 continuous days. The cumulative availability worked out at precisely 98.89% and over the period it varied between 1% and 2% better than the 155.

"On the throughput side the AS/5 got through the same workload in 25 per cent fewer CPU hours than the 155 and performed at least as well as a 158 would have done. At the moment the AS/5 is running five days a week for 24 hours, plus 12 hours on Saturday and Sunday. The 155 was live for 24 hours seven days a week.

"We are now upgrading the three Megabyte AS/5 to a five Megabyte AS/5-3, the equivalent of a 370/158-3, and we are evaluating MVS as a replacement for the present operating system, OS/MVT. One thing is sure: we know that there is absolute compatibility with IBM.

"Computers are the heart of an insurance company and there is a very high level of dependence on the data processing operation. The AS/5 handles all the production work on 400,000 individual policies, plus claims processing for two million employees of companies all over the US holding group health certificates.

"Apart from other batch work like maintaining security and mortgage portfolios and accounting, payroll and personnel applications, the AS/5 forms the centre of an internal network of 55 terminals handling online data entry and servicing telephone inquiries from agents and local offices all over the US.

"Pacific Mutual is a typical large US insurance company and I meet from time to time with my counterparts from 20 other big computer users in the insurance business to discuss common problems.

"IBM put up a tough fight when we decided to buy an Itel system, but they accepted our decision graciously. We may go back to them eventually. It all depends on what IBM comes up with in the future, and what Itel's plans are.

"The fact is that Itel offered a better financial solution last year than an IBM system, and we estimate that we should save up to $4 million in the ten-year period between 1969 and 1979 by installing plug compatible equipment.

"Apart from the Itel Advanced System and some other Itel peripherals we also have plug compatible disc drives from Calcomp and tape drives from Storage Technology. The only IBM equipment we have now is one 3211 printer and three 1403 line printers, and these are fully Itel compatible."

● First IBM-compatible Itel Advanced System to go live in Europe — page 38.

Versatec sets up UK subsidiary

A SIX-YEAR distribution agreement between the US printer and plotter manufacturer Versatec and Sintrom, its UK distributor, has come to an end with the formation by Versatec of a UK subsidiary which will sell its products directly to users.

Bill Boffin, Sintrom's sales manager, has left the company to become UK general manager of Versatec. He said he would be setting up six sales offices and four service offices in the UK.

Versatec is represented throughout Europe by agents.

Thomas Dalzell, managing director of Sintrom, said his company would not be affected by Versatec's move. Sales of microcomputer systems based on Intel microprocessors would replace the volume of sales of Versatec products.

Zilog distributor

AYLESBURY-based component distributor Memec has been appointed by Zilog as one of its UK distributors. Memec will immediately be handling the Zilog 4K static and 16K dynamic RAM devices.

'Post Office overcharges for communications'—survey

THE Post Office charges too much for communications and shows a lack of response to users' needs. These points emerge from a survey on the Post Office by Langton Information Systems and the Data Processing Management Association.

An initial analysis of replies is understood to show that a quarter of the respondents have rejected systems because of high communications costs. There are also demands for the announcement of firm price levels so that companies can plan their communications needs.

Almost half the respondents feel that that the Post Office responds too slowly to users' needs, and a similar number say the Post Office should talk more to computer industry organisations like the DPMA.

However, respondents say they get a lot of help once they overcome the problem of finding the right person to solve their problem. And they praise Viewdata, which the majority say will affect their data processing network plans.

A report on the survey is expected at the end of the month. It will be submitted to the Post Office and published at £3, or £2 to DPMA members.

US cross-licence agreement

A CROSS-LICENSING agreement has been signed between Anderson Jacobson of San Jose, and Vadic Corp of Sunnyvale, California. Anderson Jacobson gets an exclusive licence to market acoustic couplers and a non-exclusive licence to market selected modems compatible with Vadic's VA3400.

MICHIE'S PRIVATEVIEW

The two times table is alive and well

MY welcome for the classroom calculator has provoked one reader, Dr Alan Buttle, into a furious assault on a straw man (CW, October 27).

I did *not* say that children shouldn't learn their "times" tables. I personally believe that they should, and that they will continue to learn them regardless of the hand-held calculator.

Although I do not expect the procedures of long multiplication and division to drop from the syllabus, I concede that skill in executing these procedures is liable to decline.

Children will spend more time on the new skill of programming more interesting operations. So, the educational process has to lose a little to gain a little, or as I would say to gain a lot.

The same Dr Buttle believes that the child in some mysterious way shows knowledge (albeit unconscious knowledge) of Newton's dynamics and of modern control theory when he rides a bicycle.

This indicates confusion between the use of a theory to *explain* what the child does and the child's own theory by which his skilled actions are generated.

The latter, I suggest, takes the form of a collection of empirically derived pattern-based rules.

The feasibility of such learning was demonstrated many years ago by Roger Chambers and myself with a program which taught itself to balance a pole. To explain why a particular set of patterns acquired by the program should be adequate to the task does indeed require physics and control theory.

But in our program's acquisition of the pattern-based skill it knew none of this, even "unconsciously."

It knew what it knew, eg "if the pole is more or less upright and swinging to the left, move the base to the left" and so forth. There were 225 rules of this general type all told.

They *might* have been derived from a detailed mathematical model, although that would have required an exact and detailed specification of the system's physical parameters, which in a real-life situation might or might not be available. But they were not so derived. They were assembled piece-meal from the system's own operational experience.

Similarly the deep-field cricketer has extracted from experience one simple rule, that maintaining constant the direction in three-space linking him to the ball will cause them both to arrive at the same place at the same time.

Automatic acquisition of pole-balancing rules was a slow and crude business, but the topic of rule-acquisition for more sophisticated skills has recently become extremely lively.

There was published last year by the American Chemical Society a paper consisting of new spectroscopic rules exclusively devised by machine.

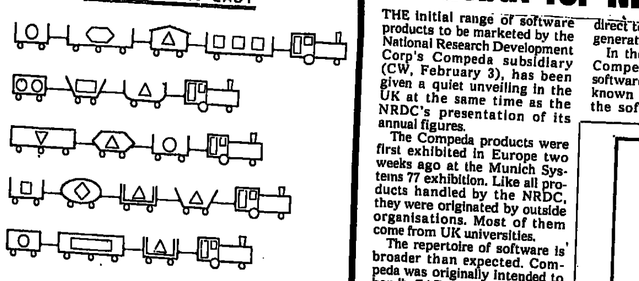
Inductive reasoning, by which the disorderly material of observation and experiment is tidied up into rule-based descriptions has fascinated empirically minded thinkers since Francis Bacon.

But the appearance of computer programs capable of reasoning constructively is relatively new. Rule-acquisition systems are now coming forward with a rush. On a quick count I noted no fewer than 25 papers in this area published during the past six months.

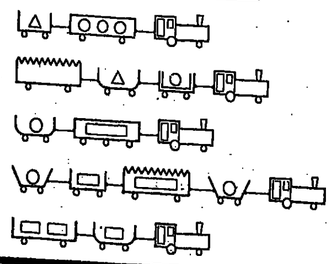
The flavour of the rule-devising game is nicely conveyed by the following test from one of the papers, by R. S. Michalski. Find the best rule you can which accurately separates the trains going east from the trains going west. There is not necessarily a unique best solution, but highest marks go to rules which are in some sense simplest.

Readers are invited to send their answers to Computer Weekly. A later Privateview will publish the winning entries and compare them with the solutions given by Michalski's program.

1. TRAINS GOING EAST



2. TRAINS GOING WEST



SOFTWARE FILE

EDITED BY STEPHEN BELL

Agony and ecstasy of freelancing

OPINIONS of the growing business of freelance programming vary. Some programmers value the security of a permanent position, while for others there is greater attraction in freelance fees, sometimes more than twice a permanent programmer's salary.

On the employers' side many installations are happy to have the services of a freelance programmer or team, to supply some temporarily needed specialist expertise or to get over a peak in the workload.

On the other hand, some employers have complained bitterly to Computer Weekly that the freelance agencies are draining a market which is already drastically short of personnel.

"Some agencies will persuade your own staff to go freelance, and then sell them back to you at a higher rate," said a representative of one large company. There is often no choice but to accept such an offer, since the shortage of programmers looking for permanent positions is so acute, he added.

One of the largest freelance programming agencies in the UK, Modem Computer Services, of London has published a free booklet entitled "A Guide to Freelance Programming."

While it is clearly designed to recruit more staff for the company, it gives a more balanced view than most advertising material, actually enumerating some of the disadvantages of freelance programming.

Modem points out that a variety of experience in different types of installation can make a programmer more marketable, but stresses that career progress is negligible.

"Clients will tend to use you for what you can do, and will not generally be interested in paying for your education," says Modem. "This is why we should recommend anybody with career ambitions to limit their period as a freelancer to around two to three years."

The booklet also gives advice on practical financial aspects of freelancing, such as the tax position and the likelihood of obtaining a mortgage.

Any advertising material bound to paint a rosy picture of the freelance business, while those seeking permanent employees will feel threatened by its continued expansion. Software File invites opinions from readers on the topic. Is the growth of freelancing, in general, a good or bad influence on the software business as a whole?

Many of the provisions of the Computing Services Association's Code of Practice for recruitment agencies are clearly relevant to the freelance recruitment business. Is there however a need for a specific freelance code of practice to prevent excessive erosion of the supply of permanent programmers?

Surprise take-over

ONE of the leading companies in commercial valuation and stocktaking services, the George, Orridge Group, has branched out in the surprising direction of software consultancy. The group has taken over an existing small firm of consultants, System Planning Associates.

SPA, with a current staff of five, was formed earlier this year following a breakaway from an unnamed bureau.

The company has ventured into many types of DP.

Projects include work on one of the few ICL 1900 implementations of Cincom's Total database.

UK debut for NRDC's packages

THE initial range of software products to be marketed by the National Research Development Corp's Compeda subsidiary (CW, February 3), has been given a quiet unveiling in the UK at the same time as the NRDC's presentation of its annual figures.

The Compeda products were first exhibited in Europe two weeks ago at the Munich Systems 77 exhibition. Like all products handled by the NRDC, they were originated by outside organisations. Most of them come from UK universities.

The repertoire of software is broader than expected. Compeda was originally intended to handle CAD products. The main emphasis is still on this area, but a number of non-CAD products, in such diverse areas as work study and computation of magnetic fields, have been included.

A major product in the CAD range is the Gaelic system for design of printed circuit boards and integrated circuits (CW, December 18, 1975). Gaelic was developed at Edinburgh University.

For printed circuit design, Gaelic automates the efficient placing and connection of components on a board, and the drawing up of materials lists.

For integrated circuits, it provides for initial simulation of the logic of the required circuit, layout, and checking of the final circuit for logical correctness, performance and adherence to mechanical design tolerances. Output can be to graphics or direct to a photographic pattern generator.

In the area of pure graphics, Compeda is marketing a software-hardware combination known as Aspect. Based on a the software enables three-dimensional point clusters or wire frame representations of solids to be defined and manipulated, as well as providing two-dimensional graphics. Figures can be rotated in real time.

Five set up consultancy to specialise in teleprocessing area

WITH an increasing number of first-time users adopting teleprocessing, a growing need has arisen for experienced consultancy in the TP area.

Aiming to supply this need, and to give TP advice for any more experienced users who require it, five independent consultants have formed themselves into a company known as Circle Computer Consultants (C3).

Co-directors of C3 are Richard Creer, Chris Heath, David Morton, Rick Trotter and David Victor, all of whom have considerable experience of TP software, particularly IBM's CICS, and of related aspects such as database management.

The five have all been independent consultants for some time, and met when working on a contract for the same large user. There are, as yet, no plans to recruit further consultants for C3, though the possibility is not discounted.

Since the consultancy commenced business last month, it has already gained two contracts.

David Morton is chairman of the Association of Independent Computer Specialists (CW, July 28), and three other C3 directors are members of the association.

Vickers joint success...

HAVING developed the Omac production control suite in collaboration with ICL, the Vickers Engineering Group has now seen the fruition of another joint venture — a manufacturing costing package that was developed in collaboration with the Computer Aided Design Centre, Cambridge.

Both Omac and the CADC suite were developed as part of a Vickers program to unify the software used in the company's various divisions (CW, March 17). The CADC software is also destined for general marketing within the next two months, said a CADC spokesman.

The suite was originally developed on Atlas 2 and ICL 1900 equipment, but the final version has been implemented on the Data General Nova 3 minicomputer. Marketing will be handled entirely by the CADC, and will be international.

The software is designed to ease estimation of the cost of machining parts in a production workshop. The estimates are based on records of standard machining times for a variety of operations.

The operator's interface with the system is through interactive graphics on a Tektronix terminal. The operator uses keywords and qualifiers to describe operations on the component, and the effect of these operations is reflected in a graphic display of the component on the screen. This helps to ensure that the information is entered accurately.

Vickers' share of the development has been handled from its Scotswood Works in Newcastle-upon-Tyne, which produces heavy engineering components.

Planned standard times for machining operations have been compared with the actual times taken for the operation and an efficiency factor calculated.

This is applied to each planned time in future calculations to produce an estimated time. Both times are shown on the visual display. Total machining times for each machine tool can also be displayed.

The system is planned for future installation at several other Vickers divisions. Application to other users' operations may not be immediate, the CADC admitted; the user may wish to change the algorithms used to calculate machining time.

PROGRAMMER NOTES

Why Algol 60 ended need for GOTO

A REPLY to the Programmer Notes column on DO loops (CW, October 27) gives a striking illustration of a point previously made in this column — that a wide gap exists between the viewpoint of the theoretical student of programming languages and that of the ordinary programmer.

We asked our readers what kind of program loop structure they preferred to use. Dr Ivan Danicic, of University College, Aberystwyth takes us to task for asking questions which have obvious answers.

"The question of your readers' preference is completely irrelevant," he says. "It is evident that the 'while' loop is more powerful than the 'step' loop, since the former includes the latter, but not vice-versa.

"It has been known since the 1930s... that the 'while' loop is theoretically, though not practically, sufficient for all computations, and that this is not the case for the 'step' loop."

Programmer Notes is ready to concede the theoretical superiority of the "while" structure, but this was not the point. We asked which structure the average programmer *preferred* to use.

As programming discipline stands at the moment, convenience, readability and compiling and running efficiency are likely to figure far higher in the list of criteria than theoretical sufficiency.

Indeed, the average programmer is unlikely to know or care much about the three-structure sufficiency proof and other such theoretical considerations. Dr Danicic implies that you should know and care more.

The most striking demonstration of the gap is in his answer to our last question, "will we ever be rid of the GOTO?" Danicic claims, "the GOTO... has been got rid of as early as 1960, with the introduction of Algol 60."

Perhaps Dr Danicic has written entirely "gotoless" programs since 1960, but this theoretically unnecessary instruction is still found among many programmers' work.

A gap between theory and practice undoubtedly exists, but why does it exist? Have programmers simply found that they can get along without complex theoretical concepts, and justifiably ignored them, or would programming be improved by study of such theory?

Among Programmer Notes readers there must be programmers who have worked without the theoretical background and subsequently acquired it. Can you point to any aspects which improved your programming? How can we best put over any valuable theoretical ideas to the average programmer?

Scicon to handle Cullinane's audit package in UK

PURSUING its involvement with the growing application of computer-aided auditing, Cullinane Corp, of Massachusetts, has developed a combined report generator and auditing package for the IBM System 3.

The software, known as Culprit/3-Auditor/3, is Cullinane's first System 3 product. It will be handled in the UK by Scicon, Cullinane's agents for the existing IBM 360/370 Culprit and should be available here by the end of the year.

The package is available in two forms. Culprit/3 provides normal report generation functions, allowing records and fields to be selected from a file, or related pair of files, sorted, totalled and manipulated by arithmetical routines and formatted into a report.

The EDP-Auditor/3 version adds functions useful to auditors such as random sampling of records, division into age categories, balance and transaction confirmations and the ability to write the output file to disc instead of printing it immediately.

Essentially, Culprit/3-Auditor/3 is a System 3 conversion of the 360/370 version, but it is also believed to include ideas from Computer Audit Systems. CAS already has a System 3 package, Sys3audit.

Contact Stuart Moore

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PEOPLE

Fastest bed in the West...

NOT, unfortunately, either of the two entered by RTZ Computer Services for the Chew Valley Round Table 10-mile sponsored bed race. Easy Glider, the systems department bed, managed to cover the 10 miles of Somersetshire valley, but operations' Not Tonight Josephine (left) collapsed half a mile from the finishing post. Nevertheless, the two teams raised over £150 for a worthy cause, the local Autistic Children's Home.

Ken Gale, formerly branch manager with Logabax, has joined Gamma as a sales executive responsible for bureau and turnkey systems in the North-East Midlands and South Yorkshire, and **Kevin Else** has become a trainee operator with Gamma.

John Grogan has become UK contracts manager with Abraxas. Previously he was a contracts salesman with Spirodon. .

David O'Riley, previously a sales engineer with Beckman Instruments, has become senior sales engineer for the North Midlands and North of England with Burr-Brown.

Bill Broekhuizen will manage the new advanced systems group within Ferranti's military systems division. Formerly he was head of the training simulator group.

Eddy Marchant has been appointed software support analyst at the Southern sales office of Harris Systems' computer systems division. Previously he was a software development engineer with Varian.

Barry Morgan has left Cambridge Instruments, where he was a production engineer, to join the production service group at the Computer-Aided Design Centre as a mechanical applications engineer.

Roger Dunivan has joined Cray Research in Bloomington, Minnesota as general sales manager, from the Rochester, New York branch of Burroughs of which he was manager.

Winter Knock-Out under way

THE Winter Knock-Out Cup is under way for the season and in the first stage of the competition the teams are divided into five groups. The top two sides from each group along with the two best third-placed teams qualify for the next round. At this stage they are divided into four groups, each of three teams, from which the top side goes forward to the semi-final to be resolved on a knock-out basis. The results so far are as follows:

Group I
CW 0, Datasolve 5
Gryphon 7, Datasolve 0
Lloyds 5, CW 0

Group II
Atkins 3, Gill 4
Gill 1, Victoria 3

Group III
ICL 2, Lewis 2
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Infotech courses December 1977

Advanced Systems and Programming

Performance Measurement and Optimisation Techniques 6-8 Dec London
Reliability Improvement Techniques 5-9 Dec London
Computer Security 29 Nov - 1 Dec London
Data Protection Techniques 6-8 Dec London
Advances in Operating Systems 13-15 Dec London
Structured Systems Programming Workshop 12-16 Dec London
Structured Testing Tools and Techniques 28 Nov - 2 Dec London
System and Project Standards Workshop 12-16 Dec London
Corporate Systems Analysis Techniques 28 Nov - 2 Dec London

Management Development

Operations Team Control and Supervision Level I 28 Nov - 2 Dec London
Operations Team Control and Supervision Level II 5-7 Dec London
Operations Management and Control Techniques 5-7 Dec London
On-Line Operations Management and Control Techniques 8-9 Dec London
Management and Control of Structured Programming Teams 5-9 Dec London
Project Planning and Control Techniques 7-9 Dec Maidenhead
Project Leadership Workshop 12-16 Dec Maidenhead
Software Management Techniques 13-15 Dec London
Improving Systems Development Productivity 13-15 Dec London
Planning Corporate EDP Resources 12-16 Dec Maidenhead

Real Time/Data Communications

Data Communications Networks 13-15 Dec London
Real Time Systems Design Workshop 28 Nov - 2 Dec London
Distributed Processing Systems 29 Nov - 1 Dec London

Structured Design

Jackson Design Methodology: Training Workshop 21 Nov - 2 Dec London
28 Nov - 9 Dec Munich
Jackson Design Methodology: Instructors' Workshop 5-16 Dec London

Data Base

The Data Base Approach: DP Management Assessment 7 Dec London
Software Selection for On-Line Data Bases 5-9 Dec London
The CODASYL Approach to Data Base Management 12-16 Dec London
How to Get the Best out of IMS 12-16 Dec London

Minicomputers and Microcomputers

Minicomputer Systems: Assessment, Selection, and Application 29 Nov - 1 Dec London
Minicomputers for Commercial Real Time 6-8 Dec London
Microprocessors: Assessment and Application 6-8 Dec London
Microcomputer Programming Techniques 12-14 Dec London
Microcomputer Software Engineering Techniques 15-16 Dec London

Operations

IBM DOS and DOS/VS Basic Operations Techniques 12-14 Dec London
IBM DOS and DOS/VS Advanced Operations Techniques 5-7 Dec London
IBM OS and OS/VS Advanced Operations Techniques 5-7 Dec London
IBM OS/VS File Control and Management Techniques 12-14 Dec London

Please send me further details of

- ☐ Advanced Systems and Programming
- ☐ Management Development
- ☐ Real Time/Data Communications
- ☐ Structured Design
- ☐ Data Base
- ☐ Minicomputers and Microcomputers
- ☐ Operations

Name_____

Title_____

Organisation_____

Address_____

Tel. no._____

Return now to:

INFOTECH Nicholson House Maidenhead Berkshire SL6 1LD England

DIARY

NOVEMBER 14
The state of play in computer chess. Edinburgh University Machine Intelligence Research Unit. Hume Tower, George Square, Edinburgh. 17.15.
TOPS — what is it? K. Green. BCS, Bedford branch. Crest Motel, Luton. 19.30.

NOVEMBER 14-15
Joint European/US software management conference — government programmes. American Institute of Aeronautics and Astronautics/Deutsche Gesellschaft für Luft- und Raumfahrt/IEEE Computer Society, Munich.

NOVEMBER 15
Coral 66, a review of implementers' experience. BCS, Coral 66 Group. IEE, Savoy Place, London WC2. 14.00.
Computer understanding by structural thesaurus techniques. Philip Sallis. BCS Natural Language Translation Group, King's College, London WC2. 18.00.

NOVEMBER 15-18
Meeting. IBM Computer Users' Association System 3 Group. Bedford Hotel, Brighton.

NOVEMBER 15-18
Metering, apparatus and tariffs for electricity supply, conference. IEE/IEEE. Organisation Internationale de Métrologie Légale. London.

NOVEMBER 16
Management Education Seminars — Communications. Dennis Jarrett. Data Processing Management Association. Montcalm Hotel, London W1. 14.00.
Database on mainframes and minicomputers. D. Trimmer. BCS, Leicester branch. James Went Bldg, the Polytechnic, Leicester. 19.00.
Machine intelligence. Ray Cahart. BCS, Dundee branch. College of Technology, Dundee. 18.00.
Dear CIM, Can you read me? Signed COM. Ron Fiddes, and visit of BCS President, BCS Microform Group. NCR Ltd, 206 Marylebone Road, London NW1. 16.30.

NOVEMBER 17
London's telecomms — switchboards to satellites. K. Ford. IEE/IEE. Medway and Maidstone College of Technology, Chatham, Kent. 19.00.
Viewdata. K. E. Clark, Institution of Electronic and Radio Engineers, Caversham Bridge Hotel, Reading, Berks. 19.30.
The national police system. G. F. Atherton. BCS, Leeds branch. Parkway Hotel, Leeds. 18.30.
Alternative programming languages. BCS, Coventry branch. Computer Centre, University of Warwick, Coventry. 19.30.
The driver and vehicle licensing centre, Swansea. J. A. Penfold. BCS, Guildford branch, Stoke Hotel, Guildford, Surrey. 19.30.

NOVEMBER 17-18
Exhibition and demonstration of university and schools projects. National Development Programme in Computer-Assisted Learning. New University of Ulster, Coleraine, Northern Ireland. Details: 01-637 0652, 0265 4141 ext 341.

NOVEMBER 21
Computer-aided cost estimation, distributed computer installations. Dr Ashcroft/Dr Wilkinson. London EC1. 14.00.
Machine-aided synthesis of rules of thumb. Edinburgh University Machine Intelligence Research Unit. Hume Tower, George Square, Edinburgh. 17.15.

NOVEMBER 22
Meet the members — inaugural meeting. DPMA, Sussex branch. 18A Chapel Road, Worthing, Sussex. 18.30. Contact A. F. Kassam, tel: Worthing 34755.
A systems approach to pictorial pattern recognition — lecture series. Morton Nadler. Machine Intelligence Research Unit. Chess Lab, MIRU, University of Edinburgh. 10.30.

NOVEMBER 22-23
Structured program development. John Parker. BCS, London branch. London. Details and registration through BCS, 01-637 0471.

NOVEMBER 22-24
Programmable instruments, conference. IERE/IEE/IEEE/IQA/BCS. National Physical Laboratory, Teddington, Middx. Register with the Meetings Officer, IERE, 9 Bedford Square, London WC1B 3RG.

NOVEMBER 23
Running a group computer facility. DPMA, Central London branch. Control Data Institute, 77 Wells Street, London W1. 18.00.
Applications of interpretative high-level languages, discussion meeting. Institution of Electrical Engineers/BCS. IEE, Savoy Place, London WC2. 17.00.
Array and vector processors. Parry. BCS, North Staffs branch. Computer Centre, University of Keele. 20.00.
Multicriteria programming for financial planning. Dr. J. J. Ashton. BCS Mathematical programming group. London School of Economics, London WC2. 18.30.
Software for computer graphics. BCS, Display Group. City University, London EC1. 14.00.
Microprocessors. R. Brunskill. BCS, Teeside branch. Teeside Polytechnic, Middlesbrough. 19.00.
The present and future for computer peripheral technology. S. O'Connel. BCS, Edinburgh branch. Mountbatten Bldg, Heriot Watt University, Edinburgh. 17.30.

NOVEMBER 24
Computers in action. BCS Medical (Scotland) Group. The Medical School, Ninewells Hospital, Dundee. 11.00. Details: D. L. Simpson, tel: 041 339 8822, ext 733.
System 10, its place in ICL's range and its capabilities. Alan Wakefield. BCS, South Wales Branch. Students' Union, Park Place, Cardiff. 19.00.

NOVEMBER 24-25
Meeting. IBM Computer Users' Association Programming Group. Grand Hotel, Bristol.

NOVEMBER 29
A year's change. Philip Hughes. BCS, ACM Chapter. Polytechnic of Central London, London W1. 18.30.

NOVEMBER 30
British activity in online information services. David Martin. Dr Philip Holmes. BCS Information Retrieval Group. City University, London EC1. 14.00.

Engineers. IEE, Savoy Place, London WC2. 14.00.
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ICL Data Entry Users' Group

THE ICL Key Edit Users' Group Southern is changing its name to ICL Data Entry Users' Group Southern, to cover all data entry equipment marketed by ICL: Key Edit, ICL 1500, ICL 7502, Scan Data, and other units. For further details about the Group contact the chairman, M. Thomas, CWS Computer Services (Southern), 99a Road, Godalming, Surrey.

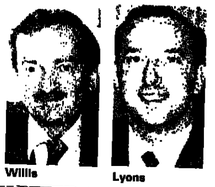
SPL directors appointed

THREE new board members have been appointed at SPL International: Vin Willis and Mike Lyons become directors, and Tony Wilson becomes an associate director.

Vin Willis has been an associate director of the company since early this year. His career has included periods with ICL, GEC and Honeywell, and before joining SPL in 1973 as a senior sales executive, he ran his own consultancy organisation. He has been involved in the building up of SPL's activities in the field of industrial computer control systems, and last year was appointed manager of the industrial division, then recently formed.

Mike Lyons was most recently SPL Svenska's manager in Sweden. Since joining SPL in 1965 he has established the first branch office, in Nottingham; SPL Svenska; and following his appointment as an associate director, the minicomputer division.

Tony Wilson has been general manager of SPL Italia since 1972, and in 1975 became administratore delegato.



Willis Lyons

Christopher Clark, formerly a systems consultant with International Programming in Sydney, Australia, has become a project manager with Gamma.

Rupert Blake has left NCR, where he was a commercial and industrial systems salesman, to become a sales executive with ERA.

Christopher Hedges has joined Intel as a systems applications engineer. For the past five years he has been a freelance design engineer working with minis and micros.

Stop Press: Computer Weekly continues to publish more advertisements for recruitment advertising and has a higher fully guaranteed A.B.C. (Audit Bureau Circulation) of 76,081 than any other U.K. computer publication.

* Additional 19,138 regular readers in Western Europe, Australia, INTERNATIONAL EDITION which is published one month every month avoiding August and December.

NEWS IN BRIEF

More room for IBM

A NEW three-storey office block has been opened by Eddie Nixon, the UK managing director of IBM at the company's Greenock, Renfrewshire, manufacturing plant.

The £3.5 million block will free space in the plant for increased manufacturing demand. More than 500 employees have been moved into it and a 700 seat cafeteria is planned for Greenock next spring.

COMPUTER systems activities at Ferranti are to be co-ordinated by Dennis Best, who takes over a new post as technical director. Formerly with that group's civil division at Wythenshawe, Best will co-ordinate and monitor computer development activities within the group's military, avionic and civil groups.

ABOUT £5 million worth of business is expected to be placed with European minicomputer manufacturers now that the Joint European Torus, JET, project has been given the go-ahead. The minis will be used for control and instrumentation of the JET machine, according to a spokesman for the Culham Laboratory, the site of the project.

NUNEATON Council is to replace its nine-year-old ICL 1901 by a Univac 9025 with 98K storage.

INTERNATIONAL chess master David Levy lost to Chess 4.6, the world computer chess champion, when Levy gave a simultaneous display against seven computer chess programs during last month's meeting in Seattle of the ACM. Chess 4.6 from Northwest University drew with Duchess from Duke University in the North American Computer Chess Championships also held in Seattle. Chesslab on David Levy page 15.

TWO Codex LSI 96/V.29 modems and two Codex 900 time division multiplexers worth £15,000 have been purchased by Navan Carpets of Co. Meath, Eire. The equipment was supplied by Cole Electronics, of Croydon, the sole marketer of Codex products in the UK and Eire.

THREE top IBM executives, among them chairman and chief executive Frank Cary and President John Opel, are on a 12-day trip to China to assess the country's data processing requirements and the opportunities for trade. No specific proposals are likely to be made to the Chinese.

REALITY computer systems worth £300,000, produced by Computer Machinery Company, of Hemel Hempstead, have been ordered by three Derbyshire local councils, Erewash Borough Council, High Peak Borough Council, and West Derbyshire District Council.

EQUIPMENT worth £40,000 has been installed by Barclays Bank to supplement the £65,000 Harris 1600 multiple communications processor supplied in March this year to its Knutsford centre. The order now comprises the CPU, three high speed printers and a card reader console.

FIGURES for Sperry Rand's second quarter, ended September 30, show that the company improved turnover rather more than profits. The Univac subsidiary did particularly well, with turnover up 12%, orders up 13% and orders in hand up 25% compared with the same period last year.

Pacesetter for the cameraman

Complex and visually stunning special effects for films can now be accomplished with Pacesetter, a computer-controlled camera and rostrum controller, from Kins Applied Technology, of Epsom. The system features a PDP 11/03, a printer with cassette unit, and interface hardware developed by Kins.

All the cameraman need do is type in details of each camera sequence, in a simple language. The system then follows these, moving the rostrum and camera to the required positions and making the correct number of exposures.

First user of Pacesetter is Camera Effects, London.

'Failing users if response times on systems exceed three seconds'

DP DEPARTMENTS were failing their users if response times on their systems exceeded three seconds.

Speaking at the fourth conference of the European Computer Measurement Association in Hamburg last week, Dr Gary Carlson, director of computer services at the Brigham Young University in Utah, pointed out that surveys he has undertaken showed that users gave top priority to reliability and response time in their requirements from the DP service.

Dr Carlson, who specialised in industrial psychology before becoming involved in computing, found that terminal users' perception of average response times corresponded closely to the worst response time they experience. A top priority was to provide a consistently fast response since users were much more sensitive to maximum than to average response times.

Exploring the use of statistics to interpret response time measurements, Dr Carlson commented that, while times deteriorated rapidly when a bottleneck emerged at about 70% loading on a critical component of a system, the variance of response time typically "takes off" at a lower loading factor. It was the latter phenomenon which upset the users.

Pointing out that performance tuning should be designed to save money, Dr Carlson reported on his extensive research on response time measurements using simple tools like an old hardware monitor and a stopwatch. The accuracy of the cheap, manual method was shown to be as good as the results from hardware and software monitors — encouraging news for users experiencing problems in automatic measurements.

He challenged delegates to "measure boldly, find the facts and then decide whether to show them to management or to hide them", in a discussion on the human problems of performance evaluation.

Dr Carlson suggested that users should be encouraged to have control of their systems. Performance measurements at Brigham Young had already resulted in a shift towards minicomputers to provide users with the service they wanted.

At the other end of the scale from minis, Dick Sayford, marketing vice-president, and John Bacon from the System Performance Architecture Department of the Amdahl Corporation, explored the state-of-the-art measurement problems which LSI circuitry was bringing on the latest generation of mainframe systems.

Bacon described the Hardware Measurement Interface now installed on the prototype 470/V6 system which incorporates hardware monitor style signal pre-processing within the "spare" logic of the chips of the machine. This technique provides some 16,000 signals which are linked to an in-board mini for diagnostic purposes.

The physical size of the system dictates its speed so that it is no longer feasible to use conventional hardware monitors with long cable attachments without incurring insurmountable timing and synchronisation problems.

Looking to the future, it was realised that LSI circuitry would demand integrated performance measurement functions to reduce input/output requirements which would actually slow down the machine. Signal speeds and the need to reduce all "cable lengths" demand LSI based hardware monitors.

ECOMA has now been asked to provide manufacturers with guidance on the measurement facilities which members require — an important step as dependence on special purpose interfaces grows.

Questioned on the Amdahl performance modelling approach, Bacon commented that he "often found the simplest models gave most accuracy; more detail added only confidence."

This tribute to recent advances in the use of analytical modelling was borne out by a user presentation by Mme Vasseur from the Ingenierie Informatique in Paris, who reported that errors of over 1% in predicted activity times in a TSO model usually betrayed a modelling error. The response time predictions could then be sought within 10% — more than adequate for most purposes.

The ECOMA conferences in 1978 are already in the advanced stages of planning and will be held at the Tara Hotel in London starting with ECOMA-5, which will take place from April 25-27.

Details of ECOMA membership can be obtained from: Scott Yeaker, ECOMA president, c/o Union Bank of Switzerland, Bahnhofstrasse 45, CH-8021 Zurich; or David Lenkey, Logica, Box 48E, 64 Newman Street, London W1A 4SE.

CTL means business in mini 'revolution'

A QUIET revolution has been taking place at Computer Technology over the past 18 months, and one of UK's leading independent minimakers now does two thirds of its business with commercial customers, with its traditional scientific, medical and educational markets reduced to a third.

The major foray into the business market really began with the launch of the 8000 series, a modernised processor using the same architecture as the Modular One and running the well developed Modus operating system unchanged (CW, May 20, 1976).

The re-design involved several enhancements including the use of the AMD 2900 bit-slice microprocessor for floating point arithmetic, and the Motorola 6800 as the VDU controller. The company is trying to use British peripherals wherever possible with Cifer VDUs and DRI printers among them.

There are now 35 business systems installed and running, with an average value of £50,000. Key features of the operating system include the ability to support up to 54 VDUs with simultaneous foreground multiprocessing and background batch.

Programming languages available include Cobol, Coral, Fortran IV, Basic, Algol and BCPL, and despite the emphasis on business these days, the attractions of Coral continue to win CTL orders. Recent European Space Agency (CW September 8). The Space Agency has 15 CTL minis altogether and the last contract, involving five minis, worth £750,000 was for two different applications; one a ground checkout system for satellites and the other a telemetry system.

CTL is also still soldiering on in the medical systems market. Among the most notable systems is a four-processor distributed installation in Oxford which consists of a Modular One central processor, front-ended by a second Modular One. This central system is linked to two remote processors, one at the Radcliffe Infirmary and the other at the Churchill Hospital.

CTL's OEM contract with ICL to provide minis for the 7900 series of front-end processors ended last year; CTL did not renew the contract because it precluded the company from other add-on business to ICL installations. However, since the expiry of the contract, CTL has supplied three further systems to ICL and although primarily designed for 1900 series machines, the front-ends can be interfaced to 2900 and System 4. In all, CTL has sold about 50 systems to ICL.

CTL did 15% of its business overseas in the year to April 1977, and expects £1 million of foreign business, 25 per cent in the current year. It has not yet published full figures for its last trading year, but reports that profits were up from £41,000 in 1975/6 to £172,000 in 1976/7.

MICRO NEWS Edited by Martin Banks

All you want to know about micros

"JUST about everything you ever wanted to know about micros, and were too scared to ask" might just be the real title for the second edition of the Electrical Research Association's report* "Microprocessors — their development and application", which has just been published.

Produced in association with Micronex Ltd of Bristol, the report allows readers to come probably as up to date as possible in the rapidly developing microprocessor field.

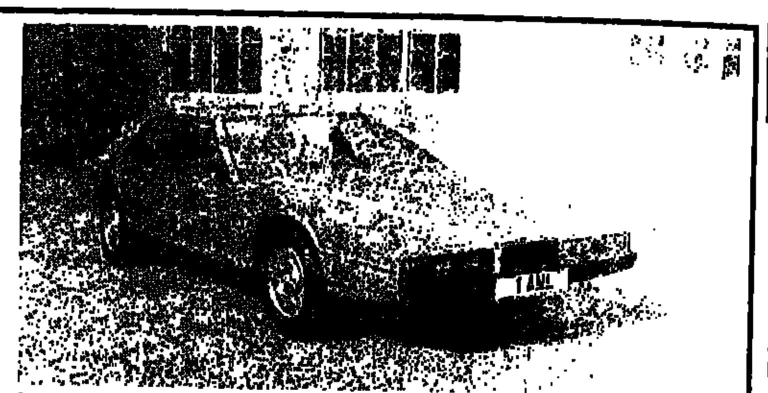
Among the wealth of information the report contains, most engineers and designers will be able to find their own starting point from which to develop their ideas. The report, for example, includes a collection of summary data sheets on virtually every micro that is available. This section is of particular importance to the potential user, for it has already taken on the task of translating the wide variety of data sheet formats from the manufacturers into a common format, thus allowing direct comparisons of the major elements of micro specifications to be made.

For the uninitiated, there is a lengthy section on getting started in the micro users' world. It covers in some depth the considerations that will play an important part in developing a useable system, starting with such non-technical decisions as device availability and multiple sources, and running on through the practical considerations of selecting a suitable processor, determining correct word length, architecture and bus structures.

On the hardware side, the report provides an assessment of single chip versus chip set processors and looks at the variety of approaches available to implement the required memory for a system.

To round things off, the report concludes with an extensive range of appendices. These cover such areas as availability of devices, listing distributors, provides a review of semiconductor and integrated circuit technologies that are commonly used, discusses the latest circuit fabrication techniques, and talks about microprogramming, its concept and achievement.

* Microprocessors — their development and application. £39. 400pp. ERA Ltd, Cleeve Road, Leatherhead, Surrey.



Some microprocessors get all the luck, riding around in high class limousines such as this Aston Martin Lagonda. The lucky ones this time are two SC/MP 8-bit and one Pace 8900, 16-bit devices from National Semiconductor, which are employed to provide the driver with a wide range of subsidiary information. This includes the digital presentation of average speed, average fuel consumption and estimated time of arrival, together with air conditioning control, multi-position seat control and memory and mechanical system status monitoring.

Shortage of static RAMS hits market

DEMAND for 4K static RAMs is creating a scarcity in the marketplace, and delivery lead times of up to 30 weeks are now being quoted by manufacturers. The shortages of both the 4K by 1 bit and 1K by 4 bit types, are being caused primarily by the unprecedented rate at which the devices are being designed into new equipment.

The undersupply situation is also being aggravated by the complexity of the technology needed to produce large static memories. User cost expectations, which have centred on a volume order price tag of $4 per device, have not been realised by the industry. Prices are still being maintained by manufacturers in the $6 to $8 range while they work on ways to reduce the size of each chip, and therefore manufacturing costs, before going for full scale volume production.

The high rate of design-in is largely the result of major customers for past semiconductor memories, in particular the 1K static, simultaneously starting equipment replacement cycles and cost reduction programmes for existing equipment. Many users appear to be hoping that prices will be where they want them to be sometime next year, and in expectation, are designing-in the parts early.

Industry predictions, however, indicate that the undersupply situation could go on well into 1978, especially as many memory manufacturers, faced with the technological problems of the 4K static, are seen to be placing much of their production efforts in the more profitable 16K dynamic RAM area.

'Kit deal' offer

A SPECIALLY-priced "kit deal", consisting of a Model 306C Centronics line printer, is being offered by Rapid Recall to buyers of the Intellec MDS 800 microcomputer development system.

When bought with the MDS 800, the printer costs an additional £1,800. The price for the printer has been reduced to £1,950.

The 306C will print up to 80 columns as standard, or up to 132 columns to special order on standard 9.5 inch wide, sprocket-driven paper. The print speed is up to 165 characters per second.

Wiring boards

A RANGE of unpopulated printed wiring boards has been introduced by Adrian Electronics to provide extension facilities for systems incorporating the AMI EVK prototype board, based on the S6800 microprocessor.

The range includes a static RAM board which may be organised as a 16K by 8 or 8K by 16 memory, a universal board fitted to hold 94, 16-pin integrated circuits which accepts up to 50-pin and one 20-pin connectors for RS232C communications, an extender board, a 6-slot mother board and a chassis unit designed to hold six boards.

Nascom number

Details of the Nascom 1 microcomputer kit (CW, November 3) can be had from Lynx Electronics, Cheshunt (92400) 70754.

LETTERS

DPMA told to shake off image

A RECENT issue (CW, Oc[t]
6) carried both the edito[rial on]
the future, if any, of the B[ritish]
Computer Society and N[eville]
Taylor's suggestion the
Data Processing Manag[ement]
Association was "the alter[native]
computing association." I[s]
this an amusing coinciden[ce?]
surely Neville did not e[xpect]
anyone to take him serio[usly].

The DPMA will need to [shake]
off its image as a cru[de]
unqualified management
Even then, how can it b[e]
represent the rank and fi[le]
industry which is being
led by too many "manage[rs"]
is vitally short of "produ[cers"].

The Association of I[ndepen]dent Specialists has n[o]
pretensions. It is a trade [asso]ciation and it exists prim[arily to]
further the business inter[ests of]
the independents and
firms which comprise its [mem]bership. Diversification
make these aims more d[ifficult]
to achieve. We prefer to g[ive]
support to the existing p[rofes]sional bodies by encou[raging]
our members to join th[e BCS]
and the Institute of [Data]
Processing. Instead of kn[ocking]
them because of their
deficiencies, we recog[nise]
that change is best effect[ed from]
the inside.

The IDP gets singular[ly little]
coverage in the compute[r press,]
but I believe that they [have]
found the right level of [qualifi]cation. Their examinati[on sylla]bus is ideally suited [to the]
environment that the stu[dent is]
likely to meet when he [enters]
the real world of data p[rocess]ing.

DAVID MO[...]
FIDP, MBCS, Chairman, [...]
London.

Is AICS serious?

IT is difficult to know if [...]
Morton is seriously att[acking]
the DPMA or whether [his]
motive is to give his
association some not[oriety].
After all, our members [are]
potential clients of AICS [...]
seems strange for the A[ICS to]
talk of diversification [when]
there are other reputab[le con]sultancy bodies in existe[nce].

However, we are happ[y that]
although Morton may n[ot take]
us seriously, many oth[ers do].
Membership inquiries and [appli]cations last month alone [...]
well over 15% of our e[xisting]
membership. Incidental[ly ...]
fore sundry crutches are [...]
in the direction of the A[...]
should be stressed that [...]
members are acknowled[ged as]
being among the most [...]
professionals in the DP [...]

NEVILLE TA[YLOR]
Chairman, DP[MA]
Maidenhead.

Computocrat

WITH reference to your [...]
for an adequate, snappy [...]
for a computer professional [...]
surprised you haven't [...]
tioned my "computocrat" [...]
March 31).

You might also like [...]
that the term "DPeople" [...]
in the heading of your [...]
week's piece was first [...]
you in a heading [...]
DPeople" to my letter [...]
17).

D. STEPHEN[...]
Group Management [...]

Call to save $100m on US software

THE US government spends over $450 million a year on software conversion; but $100 million could be saved through efficiencies in government installations.

That was the main finding of an investigation by the General Accounting Office, GAO, the federal government's auditing bureau.

Representing the country's largest single user of computers, the US government boasts an inventory of 10,000 machines that costs more than $10 thousand million annually. GAO found that the government spends $6 thousand million a year on software.

GAO estimates that about half the amount spent on software, or $3 thousand million, goes toward maintaining and converting computer programs after the software is acquired.

The audit bureau surmises that conversion costs incurred in replacing systems total one-seventh of that $3 thousand million, or over $425 million.

This estimate was arrived at by determining that the typical life of a hardware system is seven years and that one year is spent to convert completely old software to a new system.

Another $25 million is spent converting programs acquired from sources other than the user's site, perhaps from another government agency.

To determine how much of that sum could be saved, the GAO investigators interviewed programmers and their supervisors in the various federal agencies, as well as "experts" on program development and software conversion.

The former group said 40% of current costs could be saved through improved planning and conversion practices; the latter group claimed that only a 24% reduction was possible.

GAO decided to back the more conservative estimate, particularly as it coincided with the estimate arrived at independently by consultants GAO had hired to help with the study.

A major means of reducing the skyrocketing costs, GAO argued, would be creation of a federal software conversion centre.

Such a centre, says GAO, could go a long way towards eliminating what the group identified as the most important cause of conversion problems: the lack of readily available conversion expertise within the government.

As envisaged by GAO, a conversion centre could provide government agencies with estimates on expensive agency procurements which had significant conversion costs.

Additionally the independent entity could advise agencies of the conversion implications of system procurement alternatives and perform actual conversions for agencies which desired help.

Other conversion problems cited by GAO included the poor quality of software that was converted, inadequate documentation, selection of new equipment that required more work during conversions because there were no standards among manufacturers, and a lack of programmer productivity aids.

"Not all of these factors are readily controllable," GAO confessed to Congress, but they suggested some remedies.

One is that the Department of Commerce's National Bureau of Standards should select and publish a set of programmer productivity aids for government use.

These aids could improve the efficiency of programmers on both the original development of software and on software conversion.

SEL 32/55 for space centre

THE George C. Marshall Space Flight Centre in Huntsville, Alabama, has ordered an SEL 32/55 system worth more than $100,000, to be used by the Office of Research and Space Technology in the design and test of larger scale integrated circuits.

OP SPOT

"GOING contract allows an operator to look about, and is a good way of playing the field."

What awaits contract operators

"MANY contract operators have good management potential, due to their experience in problem solving and dealing with personnel of different levels at various installations," according to Sue Smyth, operations co-ordinator at Knights Computer Services in London.

There would appear to be a considerable demand for the services of contract staff within the computer industry. Most companies hire them at some time, such as when permanent staff are on holiday or have gone sick, or when a new system is being implemented and the installation concerned has no permanent operators with relevant experience.

At Knights, the basic requirement of contract operators is "two and half years' good mainframe experience," says Sue Smyth. This being so, contract staff should be able to handle all aspects of operations.

An experienced operator, although usually matched with a contract appropriate to his/her operating system and mainframe experience, should be able to adapt to the working of most systems.

Yet the manner in which they are used varies significantly from one company to the next. At some installations they are used mainly for peripheral operation and as such their experience is often wasted.

But that is not always so; sometimes they are encouraged to play a full role in the running of the installation.

The supply of contract staff is drawn from a number of different sources. Many, according to Sue Smyth, are operators seeking a permanent position and "going contract allows them to look about and is a good way of playing the field."

Others are tourists who are looking to earn some money over a short period of time and as such are prepared to travel to most areas.

Contract operators are often students, who acquired operating experience before going on to further studies, and they look to increment their income during holidays.

Another category consists of operators with many years' experience who are disillusioned with the idea of operations as a career. Many of these are involved in contract work with a view to save as much as possible in order to start their own business and leave operations completely.

Contract operators are sometimes resented by the permanent staff because of the higher salary they receive. Consequently the contract operator will sometimes get most of the less pleasant tasks involved in operations. So they have to learn to communicate and deal with people who are not always sympathetic towards them.

On long-term contracts, though, the situation is often rather different and the contractor becomes an accepted member of the shift. Indeed, they are sometimes offered permanent positions with the company and accept or decline depending on their motives for doing contract work initially.

Op Spot would like to hear the comments of contract operators and consider their views.

First UK university database specialist centre opens in Aberdeen

THE first database specialist centre in UK universities was formally opened last week at Aberdeen. The occasion was notable not only for university computing but also for Honeywell, as Aberdeen, with a dual 66/80, is the company's first big university customer in the UK.

The main reason Honeywell won the order was its IDS II database system, described by Aberdeen as the most advanced implementation of the 1975 Codasyl specification. Aberdeen is a member of the Codasyl data definition language committee and has the highest concentration of databases in UK universities.

The university's database work will directly benefit Honeywell. Aberdeen has developed a Fortran interface to IDS II which will be sold by Honeywell and is also working on a pointer array feature. Other projects are being discussed with the company.

The user service centre at Aberdeen University is on the opposite side of the campus to the computer centre. The level 6/06 minicomputer shown here acts as a concentrator for terminals, a printer and card reader. It is linked to the 66/80 by a very fast line.

Brian Rule, director of the computing centre, stressed that his staff's first responsibility was to the university.

"We are working for the university," he said. "Honeywell just happens to be going in the same direction as us. There will be no restriction on our publishing the results of our work. Honeywell will get the goods and everyone else will get the information."

Russ Henderson, Honeywell managing director, added: "A university can create wide ideas. Business users have to be narrower in their outlook. The university ideas can benefit the business users."

Aberdeen will make 25% of its power available to the universities of Dundee, St Andrews and Heriot-Watt, and between 12 and 13% available to other universities.

Nixdorf challenge to IBM phone concept

RADICALLY different approaches to the marriage of the telephone and the computer system are being taken by Nixdorf and IBM.

The difference becomes immediately obvious when the standard handset of the Nixdorf 8811 data telephone is compared with a standard handset attached to IBM's 3750 switching system. The Nixdorf handset is a highly developed microcomputer, whereas the 3750 handset is usually a standard push-button or rotary dial telephone.

Nixdorf puts the bulk of the intelligence at the user's desk, whereas the IBM 3750 system is controlled almost exclusively from the central systems console which is normally installed in a dedicated air-conditioned room.

The Nixdorf device is not, of course, a complete telephone and data switching system, whereas the IBM 3750 is. In the case of the 8811, attaching it to a simple private branch exchange, PBX, turns the exchange into an automatic exchange, PABX.

With the 3750, the central processing complex handles the switching and all the extension definition functions. It consists of two large 16-bit minicomputers, one live, the other on standby, developed from the IBM 1800 with additional interrupts, more instructions and implemented in 1973 technology.

With the Nixdorf 8811, functions like abbreviated dialling, automatic call transfer to another extension and so forth, are initiated from the handset and handled by the integral microcomputer.

With the 3750, a wide range of peripheral systems can be attached to the central processing units, specifically the Office System 6 word processing system and the 6640 ink-jet document printer, and it can be driven by a second computer, anything from a System 32 to a large 370.

The Nixdorf approach is to attach small peripheral devices to the telephone itself.

The basic 8811 unit consists of a handset including loudspeaker, keypad and 16-character strip display for data and number verification, attached to two lines, one for voice, the other for voice plus data. It costs about £1,250.

Attachments already available include an alpha keyboard, £125; a magnetic identity card reader, £500; a small 80-column punched card reader, £1,000; a 5-inch 320 or 960 character VDU display, £1,000; a 30 cps 80-position character printer, £1,000; and a 20-position 240 lpm line printer, £500.

More comprehensive peripheral devices are on the way from Nixdorf, but exploitation of the 8811 is being hampered in Europe by PTT rules that data may not be transmitted over switched lines using devices like the 8811 with integral modems.

As a result, the 8811 can only be used in West Germany within one company, albeit between remote sites over leased lines. Similar restrictions apply to the 3750, but it is noteworthy that where IBM has not announced the 3750 in the US, Nixdorf acquired key-to-disc specialist Entre of Massachusetts primarily as a US launch-pad for the 8811.

It is also clear that the 8811 is an ideal business terminal device for Viewdata, the UK Post Office experimental service which links the TV set via the telephone to a computer database.

IBM is also restricted in what it can actually offer with the 3750 by PTT regulations; the concept of electronic mail can only at present be implemented in-house, and then only in some European countries.

Where the 8811 is a very simple low-cost system which has been developed from the ground up, the 3750 is a large, heavily-centralised system which is only cost-effective in installations where 300 to 400 extensions are needed.

Once installed, the 3750 offers enormous add-on potential, particularly for things like security devices on restricted areas, centralised facilities for security officers, flexible working hours recording, cashless canteen point-of-sale recording and the embryo but fast-growing world of office automation. Being centralised it offers comprehensive management information facilities, particularly things like statistics of extension usage.

It is almost entirely outside the control of the end-user, whereas with the 8811, every function is controlled initiated not centrally but the extension by the user.

Next year, Nixdorf introduce an "Intel multiplexer," which will on the 8811 most of the fe of the 3750 while reta control of the system extension. Plant data co systems, computer-aided for electronic mail and alarm systems are all envi as applications for the 881

The configuration of the Nixdorf 8811 data telephone shown includes the 80-column character printer, on the right of the centre the unit itself, which includes, right, the slot for magnetic cards and the five-inch CRT display; the girl is using the full alphanumeric keyb The configuration shown would cost just under £4,000.

Project could lead to CAL centre

A PROJECT which could lead to the formation of a national centre of information and collaboration on computer assisted learning for both education and industry is getting under way at Imperial College, part of London University.

The project, called Cedar, or computers in education as a resource, could go a long way towards taking over from the National Development Programme in Computer Assisted Learning, which comes to the end of its five-year life in December.

Cedar is being run by Nick Rushby, one of the national development programme team. It will be funded for the calendar year of 1978 by Imperial College's computer centre but Rushby says that if the project proves its worth, long-term funding will be sought from other sources.

Cedar involves the setting up of information and software services. The information service will be based partly on a database of details of projects run by the national development programme and of bibliographic references on computer assisted learning.

Rushby is also setting up a demonstration room in the college's library, where a Tektronix display terminal will be available for trying out computer assisted learning packages. The Metronet network linking London University colleges will mean that the terminal could access systems on different models of computer all over London.

The demonstration room will also be equipped with a projector for presentations of other computer assisted learning systems, and there will also be a microcomputer for evaluation by visiting teachers and for software development by the Cedar team.

As part of the software service, Rushby will seek existing packages and modify them to meet individual needs rather than develop software from scratch.

During the first year Rushby's main responsibility will be to co-ordinate and encourage the use of computer assisted learning at Imperial College, but he will also maintain the college's tradition of being outward looking and close to industry by seeking to help and collaborate with other universities, colleges and industry.

"Because universities have so little money, the big user of computer assisted learning in the short term is going to be industry," said Rushby, adding that there was nowhere industry could go for unbiased and informed opinion. He would like to see Imperial College meeting that need.

Rushby is keen to ensure that contacts established between colleges, schools, universities and industry during the national development programme are maintained.

Cedar will encourage these contacts through a newsletter and through free seminars. The first is on November 30, when Neil Spoonley of the education division of Control Data will talk on computers in education, while on December 14 Richard Hooper, director of the national programme, will talk abo claims and the reality computer assisted lear Both are at 2.30 pm. in le theatre 145, Huxley Bui Queen's Gate, London SW

A final word from Ru "Computer assisted learn part of educational techn It's not something spec lump it in with tapes and and even with blackboard chalk."

Educational institut companies and organisations interest learning about com assisted learning collaborating with the C group should contact Rushby, Cedar Project, Im College Computer Ce Exhibition Road, London S

DP/user communication Part 4 — by Nigel Laurie

Yardsticks should be agreed

IN my first article (How to Communicate with the End User, CW October 20) I said that often users and DP staff form two groups divided by a common technology. The way we talk reflects the problem.

I am not referring to the traditional problem of jargon which has been around for years and the impact of which is well known. If users do not understand what a "root phase" or "real storage" is, for instance, they can always ask and sometimes do. They know they don't fully understand such terms. The only harm they do is create confusion.

Now, however, the growth of end users has brought a new class of jargon. It threatens to undermine user relations by destroying goodwill. It consists of terms users do understand — and yet don't. Words they stubbornly refuse to redefine in DP terms.

Perhaps a "user phrase book" would help them survive in the new terrain? Here are three possible entries to help users get their bearings.

Available — You would probably say a system is "available" when you can use the service it provides. If you cannot find a terminal, cannot get a line, cannot sign on or cannot invoke the right program you may conclude the service is not available to you. But you could be mistaken. It is a DP service and in DP terms systems can be "available when the service is not available.

Performance — Your "performance" is judged in many ways. You are doubtless expected to show imagination . . . creativity . . . flair and foresight on the job. You have to adapt to new needs when the future proves that it is always different. You have to adapt to the right things — as well as in the right way.

Don't think to judge your DP service in this way. Its "performance" will be outstanding if it does exactly what you asked for when you talked to the analyst way back. Remember? You had a hard time defining your needs but managed to settle for what looked like a feasible account of what you wanted. So, if the system is now behind the times because your needs have moved on . . . its "performance" can still be 100%.

Reliable—Some makes of cars are more "reliable" than others. Doubtless you let first-hand experience — and input from trusted friends — shape your outlook. When it comes to your DP service you'll have to drop the habit. Learn to accept that your personal experience matters less than the overall record — the statistics the DP people keep. Of course your DP contact will sympathise and help if you are unlucky — but don't expect him to agree that the system is unreliable just because it sank you when it really mattered. Take a broader — and, let's face it, *more logical* — view of failure.

Practice with any new language helps and certainly constant, two-way communication is useful. But, to start with, common ground must be marked out. Yardsticks should be agreed which users will both *understand and accept* as fair ways of judging the service. Then the phrase book will not be needed.

CW/DPMA workshop details

Date: December 1
Venue: Holiday Inn, George St, London W1
Price: £45 plus VAT (£40 plus VAT for DPMA members) including lunch and refreshments.

COMPUTER WEEKLY in conjunction with the Data Processing Management Association is organising a workshop on December 1 aimed at improving the skills of DP management in communicating with end users.

The workshop will be given by Nigel Laurie, who has more than 10 years' experience in the communications and computer fields. He is currently writing a series of articles for Computer Weekly on DP/user communications, which will form the basis of the workshop (see this page).

Topics to be covered during the workshop include the management of user communications; aids to better communication (joint task forces, handbooks, HELP routines, annual user reports, etc); and practical guidelines to good user communications.

The workshop is designed to provide the participants with practical information that can be effectively implemented and will include small in-depth working groups.

Numbers are limited to ensure that all delegates are able to participate fully in the day's work, but if there is sufficient demand, further workshops will be held.

In order to ensure that the workshop is tailored to DP Management's real needs, the DPMA is currently conducting a survey of its members on DP/user communications. Survey forms can be obtained from the DPMA, 27a York Road, Maidenhead, Berkshire SL6 1SQ. Tel: 0628 29979.

If you would like to attend the workshop, please complete the form below.

I wish to order . . . . ticket(s) at £45 plus VAT (at 8%) for the CW/DPMA workshop to be held at the Holiday Inn on December 1.

DPMA members can apply for reduced rate tickets via the form that is being sent to all DPMA members.

Cheques should be made payable to IPC Business and Industrial Training Ltd.

Name .....

Job function .....

Address .....

.....

..... Telephone number .....

If you are interested in attending any future workshop because the December 1 meeting is full or is inconvenient, tick here ☐

Return this coupon to Computer Weekly/DPMA Workshop, IPC Business and Industrial Training, Throwley Way, Sutton, Surrey SM1 4QQ.

CHESSLAB — by DONALD MICHIE

Rules and patterns

I AM sometimes asked why I think that International Master David Levy will be beaten by a computer program before August 31 next year. My answer is not just that programs are getting better. Equally important is that Levy's playing skill is under constant pressure from "exposition disease". He can't stop writing chess books.

I have it from Levy himself that his remorseless stream of half a dozen excellent texts per year helps every player but him.

A. L. Samuel, the father of computer game-playing, had a post-graduate student who was a strong Go player and programmed aspects of play for a PhD degree at Stanford University. He got his PhD but ruined his game.

Walter Hellman, who worked as a stock-clerk in a warehouse, was World Checkers Champion almost without interruption from 1928 until a few years ago. He once confided in Samuel that he had not the slightest idea how he did it and had no intention of finding out. He considered that he played better when he didn't analyse. He just looked at the board and his encyclopaedic memory of significant patterns instantly triggered for him the right move.

But are not numerous books written by great masters about refinements of play in every phase of checkers? Would they expound their precious skills if that were the way to spoil them?

Samuel made a patient and detailed study of the precepts of the masters. He discovered that there is no trace of consistency between what the books advocate and what their authors actually do in the tournaments. There is not always consistency between different pages of the same book. Whatever it is that the masters are expounding, it is not the same stuff as the skills which they practise professionally. The Balkan peoples have a saying: "Do what the priest says, not what he does!" but here the opposite is true.

Older and subtler cultures have always known this for the even more complex pattern-oriented skills required for the inner life. In order thoroughly to stamp out the student's imbecile idea that wisdom can be assimilated through verbal instruction, the Zen master gives him absurd homework like, "What is the sound of one hand clapping?" If that does not cure him, then perhaps a shout of "Ho!" and a belt on the ear will. The master could say, like Hellman, that he has no idea how he does it. But who would believe him?

It is possible to jump to all sorts of unwarranted and obscurantist conclusions, like: "What use, then, is book-learning?" The plausible supposition is that the final form in which highly trained skills are laid down is not indexed by symbolic linguistic expressions from which read-out entails slow processes of parsing, but by structured patterns accessed by fast and highly parallel matching.

The sources from which such internal encyclopaedias of pattern-knowledge are built up would include symbolic representations initially got into memory from verbal and textual instruction, as well as the more direct source of trial-and-error learning ("practice").

The relative importance of the two sources might vary from one task to another, with logic, language and chess, say, depending to a significant degree on the input and parsing of tutorial symbol-strings, while checkers, tennis, Zen Buddhism and recognising faces might rely almost exclusively on the direct route: some things can be learned, but not taught.

The language skills involved in exposition are known to be chiefly handled by the left hemisphere of the brain, and pattern-perception, spatial and associative skills chiefly by the right. To parody my idea, without losing its essential flavour, let us suppose that left-half material can readily be transferred to the right hemisphere, there to be translated to pattern form, but that Nature has supplied no easy way of "de-compiling" it from right back to left again. Then if the masters play checkers with their right hemispheres but write books with their left, what else would one expect than what Samuel actually found?

Certainly the art of translating trained skills into clear, accurate and complete written expositions is one which has come very late to mankind. Judging by the manuals which come my way I am not at all sure that evolution has equipped the human brain for the task at all!

Recently Ivan Bratko and I did an experiment with a new art called "computer-aided manual-writing". The test task was the play of king and rook against king, one of the elementary mates dealt with in two or three pages of almost any basic chess primer. Figure 1 is the micro-manual which we obtained.

WHENEVER IT IS YOUR TURN TO PLAY, DO AS FOLLOWS:

1. Look for a way to mate the enemy king in one or two moves.
2. If that is not possible, then look for a way to further constrain the area to which your rook confines the enemy king.
3. If that is not possible, then look for a way to move your king closer to the enemy king.
4. If none of the above is attainable, preserve existing gains under headings 2 and 3 (make a waiting move).
5. If none of the above is attainable, then make sure of having after the next or the following move, the two kings spearated by your rook's line of fire.
6. At all times avoid stalemate, or loss of the rook.

Figure 1: Bratko and Michie's micro-manual

The reader who knows only the rules of chess can become move-perfect in the tiny world of king-rook-king simply by memorising this manual. He might care to try doing the same with the appropriate pages of a man-made primer! With our micro-manual comes a guarantee that it is (a) correct and (b) complete. Bratko was able to prove this formally.

There is a hint that one of the coming themes in machine intelligence will be the machine-aided restructuring of human knowledge-sources for use by humans. In a later Chesslab I shall mention some reasons and examples which lend support to this.

FUTUREVIEW

Arthur C. Clarke . . . "Already technology has changed the face of Europa."

In the last Futureview, Dr Isaac Asimov lifted part of the mist surrounding the future. His Three Laws of Robotics were presented and the relevance of science fiction to the future of computers discussed. The concept of Man was also questioned.

With this interview we dispel more of the mist as ROBIN WEBSTER talks to scientist and writer Arthur C. Clarke, who lives in Sri Lanka, about his own provocative Futureview.

Clarke speculates on the nature of machine intelligence and some of his views may surprise. He also probes the lifestyle that lies ahead for everyone, and theorises an "intelligence split" in the world's population.

Credited with virtually starting the communications satellite business with his 1945 paper on "Extra-Terrestrial Relays" published in Wireless World, he is best remembered for 2001: A Space Odyssey.

A renowned science fact writer, he has developed Clarke's Laws. These are: When a distinguished but elderly scientist states that something is possible, he is almost certainly right; when he states that something is impossible, he is very probably wrong. The only way to define the limits of the possible is by going beyond them into the impossible. Any sufficiently advanced technology is indistinguishable from magic.

A world ruled by supersystems — and the lifestyle that lies ahead

SEEN through the eyes of writer Arthur C. Clarke, an incredible future lies ahead for Man. A future with global organisations, that can only be called Supersystems, running the world . . . a time when work will no longer be necessary and computer networks will handle our total information and communication requirements.

Technology has become a great engine driving us onwards, but already there is a growing feeling that unless mankind responds correctly and quickly to the influx of technology it will be overtaken on the evolutionary scale by another species.

We, as Homo Sapiens, will be supplanted by Machina Sapiens.

For Clarke there is no alternative scenario, and in Profiles of the Future* he spans past, present, and future time to write this:

". . . tools invented Man. They were very primitive tools in the hands of creatures who were little more than apes. Yet they led to us — and to the eventual extinction of the apeman who first wielded them.

"Now the cycle is about to begin again; but neither history nor prehistory ever exactly repeats itself, and this time there will be a fascinating twist in the plot. The tools the apemen invented caused them to evolve into their successor, Homo Sapiens. The tools we have invented is our successor. Biological evolution has given way to a far more rapid process — technology evolution. To put it bluntly and brutally, the machine is going to take over."

He takes no credit for this as an original idea, and even suggests that such a "prophet of doom" attitude is a bit of an old cliche. But if we are to look at such a statement seriously, what proof is there to support it?

Clarke himself offered an answer during a recent visit to the UK.

"I have just come from a space conference in Prague, the annual meeting of all the space societies. One of the sessions there was about communications with extra-terrestrials. This is going to be one of the most interesting aspects; it turns out that most, or all, advanced extra-terrestrials are machines. This will then prove the thesis."

Does this mean that Machina Sapiens will only appear when our civilisation is very advanced, a matter of centuries, or will it be before the year 2000?

"Some people have said it will be a short term thing, others have vehemently denied it," he said. "There is a book called Computer Power and Human Reason,* written by J. Weizenbaum, an MIT professor. It is a very important book in that he criticises mainly from the humanitarian or human point of view, although he is a professor of computer science, the people who say we will develop artificial intelligence.

"In some cases he doesn't deny that we may be able to do some of these things, although he does shoot down some of the more extreme claims, but the point is that we should not do some of these things — like the neutron bomb."

One concept that embodies much of what technology seems to be striving for is that of the Ultra Intelligent Machine, suggested by the mathematician and philosopher, Professor I. J. Good. It can be described basically as a man-made special that, once created, will be subject to rapid evolution, but an evolution it inevitably controls. Unlike Man, who is presently subject to the whims of Nature, the UIM can be anything it wishes.

They will be an unknown quantity, but already there are suggestions that they may take over human roles and possibly act instead of geniuses.

"Well, I know Good thinks so," said Clarke, "and he's a bright guy. Good once said, 'The first intelligent machine is the last invention Man ever need make' . . . and I used to say, yes, it may be the last he is ever permitted to make."

Robots are conventionally surrounded by an aura of hostility, but Clarke rejects this.

Instead, he smiled and said: "Again, I used to say if there was a war between men and machines, I know which side would have started it.

"I have no doubt about there eventually being artificial intelligence greater than the intelligence of Man, certainly in selected areas. Now whether in general you can do this — it depends on what you want to do . . . whether you could make a machine to compose a symphony. Obviously you could, but would it be a symphony that can only be purely appreciated by other computers?"

This raises an important question. Will intelligent machines have the same interests as ourselves or will they create their own?

"They would have totally different interests, and would not be bound by our morals unless these were built in, like Isaac's Three Laws (Dr Isaac Asimov, Futureview, October 13)," he said.

"Isaac met me at the premiere of 2001, in the interval or so he says, I don't remember exactly. It was obvious by then that Hal was going to do something nasty and he said: 'Arthur, you've violated the First Law.' Later in his recollections Isaac wrote: 'and Arthur's great mind obviously functioned because he said — So What?' Actually, I did remind Isaac and others who brought up the First Law (A robot may not injure a human being or, through inaction, allow a human being to come to harm) that most robots made so far have been for the express purpose of killing people."

Hal, of course, is the talking, thinking, computer which controls functions on board a Jupiter-bound spacecraft. Initially, it operates normally, but eventually plans to take over the mission, killing all but one of the human crew. This final human then battles against Hal, winning of course, by "pulling the plug," while the computer becomes a confused, babbling entity which eventually "dies."

Clarke does not believe Hal will be a reality in a very short time.

"I'm sure Hal will not be achieved by 2001," he said, "but I'm pretty sure it will be achieved by 2100."

Another comment he made in Profiles of the Future, was that present-day computers are "high-speed morons" and at a "flint-axe stage of evolution," and that many people obtain a spurious sense of security from such statements.

"No machine, they argue, can possibly be more intelligent than its makers — the men who designed it and planned its function," he wrote. "The argument is wholly fallacious; those who still bring it forth are like the buggy-whip makers who used to poke fun at stranded Model Ts."

Assuming that most computers still follow programmed instructions, are they still morons?

"Well, yes. Except that, of course, you can program them to do things, which if they continue to do them, or if you program them to learn, as in principle can be done, then it is an open-ended process.

"After a while the computer might be doing things that were no longer comprehensible to you, but it will still be true in an academic way that you had programmed it to do this."

A modern trend is towards hand-held computers. Work is currently progressing on micro-based systems that will find far-reaching applications in education, and in personal use.

This trend was noticed by Clarke.

"The last time I thought seriously about a form of computer, admittedly only a portable, personal one, was in my book Imperial Earth,*" he said.

Set in the year 2276, the personal computer is called a Minisec. The following extract is Clarke's description of it:

"The 'Sec was the standard size of all such units, determined by what could fit comfortably in the normal human hand. At a quick glance, it did not differ greatly from one of the small electronic calculators that had started coming into general use in the late twentieth century; it was, however, infinitely more versatile, and Duncan could not imagine how life would be possible without it.

"Because of the finite size of clumsy human fingers, it had no more controls than its ancestors of three centuries earlier. There were 50 neat little studs; each, however, had a virtually unlimited number of functions according to the mode of operation — for the character visible each stud changed according the mode."

"Thus on ALPHA-NUMER 26 of the studs bore the letter the alphabet, while ten sho the digits zero to nine. MATHS, the letters disappe from the alphabetical studs were replaced by ×, +, - and all the stand mathematical functio Another mode was DICTIO ARY: the 'Sec stored ov hundred thousand words, w three-line definitions could displayed on the bright l screen, steadily rolling over by page if desired. CLOCK CALENDAR also used screen for display, but for ing with vast amounts of i mation it was desirable to the 'Sec to the much lar screen of a standard console

This link-up was achieved an optical interface operati the near ultraviolet range, w had a data transmission/re capability of Megabits second.

Designing it was a nat process, he says. "I wrote Imperial Earth a couple of ye ago, but I assume that all was sit down and say, 'W facilities would you really lik have?' That's the way to do kind of thing. Ignoring technological, financial or c restraints, what would really like to carry around you and what should it That's all."

"No one can imagine what will have in 100 years and course, this story is set 300 ye in the future. There just ar any limits. I mean there are technological limits to anyth There are financial and reso and time limits, but other limits just don't exist. Wha happening now is that w package density they have viously run up against the of speed because they h practically reached the velocity of light in the circuits anyw What we know we can do existing techniques is reliable able, and we are not sure how are the end by any means, co still remember those predictions about the size of computers the Empire State Building the water of Niagara Fall cool it. Now they are matchbo size."

With the introduction of croprocessors a new consum area for computers was open up — the home — but Clarke h some reservations about this.

"I'm a bit worried. In our homes you can have all the things, but can you imagine John Q. Public or Mrs Jones Public using them? I know people who were helpless television sets, dial telephones and electric cookers and it is amazing how

the new generation does take this sort of thing for granted. I don't know if the human race is going to split two ways, into the morons and the rest.

"This is exactly the scenario that Wells described in The Time Machine in the last century, and which was done in a beautiful story called The Marching Morons by Cornbluth. That is a story in a world of the future where a few harassed geniuses have to handle a world of idiots.

"It reminds me of the poem: Happy little moron, Lucky little man, I wish I were a moron, My God, perhaps I am! It gives the general idea."

One interesting aspect of the current direction of computer technology is that the man/machine interface is becoming simpler while the machines themselves become more complex.

"In principle, the more one learns, as long as one does learn it, the better for all concerned," said Clarke. "There is an unjustified fear of computers and an unjustified belief in their abilities; there are two opposite ends. Computers are often blamed for programming errors, yet they are praised unjustly.

"There is a famous story by Gordon Dickson about the library and the overdue book. That is the classic computer story, in the form of computer print-outs I think. It starts off with a guy who has an overdue library book and it is Stevenson's Kidnapped. The whole thing escalates through the computer society, and with kidnapping being a capital offence, he ends up being automatically executed before anyone can even find out what is happening."

Clarke has no fears about computers removing human jobs because it is almost a fait accompli, but says it will "hopefully give us more spare time, and eventually lead to full unemployment," a situation he expects will be good for educated people, but "disastrous" for others.

Information systems will play an important part in our future lives.

"Well, we of course get 'information pollution,' which is already with us, heaven knows," he said, "but I look forward to selective information services. In fact, this is what I am writing up in my new book, The View From Serendip. You will set up a profile of the things that interest you, with various headings, and then you'll automatically have a print-out of the display every day.

"You will say what to file for future reference; you don't want to go through acres of junk. Of course the advertisers will be very unhappy about this as they rely on catching your eye, and you will miss a lot of interesting things which you spot by serendipity. So there will still have to be a fair amount of random access as well, but at least if you have proper headings then you will know you are not missing things that interest you.

"You must not have too many headings, but eventually, in the course of a lifetime, one could develop and re-edit one's interest profile, every year perhaps, and rely on your home computer or some central computer to do the shifting and sifting for you. Mail will be replaced, as it is to some extent, by people in the computer 'nets' with interactive systems where you just address a general message to everyone in the net or a special to Joe Soap. Whether that can be made worldwide is another thing."

Themes like this have been used in many science-fiction stories. So what was the value of science-fiction as a form of literature and as a crystal ball?

"It has many values," he said. "If it is fiction, its main purpose is entertainment, and the creation of a work of art. If that isn't too portentous a remark. But also, unlike other types of fiction, it can — it doesn't always — but can serve as an early warning system. I discussed this with some Russian and Czech interviewers in Prague, and naughtily mentioned 1984 and Huxley's Brave New World. Which of course they knew about. The developments that have happened since Orwell's time, which he never dreamed of, could make 1984 technically possible. It could not have been done with his technology, he had no idea how it could be done. It could now be all too possible.

"But at the same time, the explosion of information systems and other developments do perhaps give a counter-weight because it may be impossible to censor or prevent people's knowledge of what is happening anywhere in the world when we have global satellite systems.

"Also, I have said many times recently that one of the things that is going to happen is the evolution of Supersystems of which Intelsat is one prototype. The World Weather Watch, the World Health Organisation, and others; all these global bodies being set up in which countries that hate each other's guts are having to co-operate for their own mutual benefit. I think these systems will eventually be running the world."

Clarke's talents for prophecy are equalled by few, but we owe him even more for crystallising scenes from the future for all to see, for all time.

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at IFIP in Toronto this year was given by Nicholas Negroponte of the Massachusetts Institute of Technology. His speech came in a session on the future of computer aided design. But the system he described adds completely new dimensions to current concepts of the use of computers for visualising design ideas. Professor DONALD MICHIE, head of the Machine Intelligence Unit at Edinburgh University, describes Negroponte's work at MIT which enables the computer user to "drive through a database much as a pilot flies an aeroplane."

Pressing the fun button

COMPUTER Aided Design has been called many things. To Nicholas Negroponte and his colleagues of the MIT Architecture Machine Group it is "a self-serving exercise in fiddling with details, for the most part unrelated to what anybody would call design."

As they see it, the designer's creative role cannot be realised so long as he is confined to peering at and editing black and white drawings on conventional CRT displays. In the MIT system the user flies bodily (so his real time sensory cues tell him) around line drawings, full colour photographs, passages of text, and anything else he cares to have the computer project from his files on to the office wall.

He can zoom right through the display to discover layer upon layer of further data-surfaces, each of which he can navigate from his instrumented chair. Using pressure-sensitive joysticks with tactile feed-back, he drives through the database much as a pilot flies an aeroplane. He can also assign his own new creations (in full colour) to this simulated environment, to which he can even listen if he wants to.

As William Donelson, one of the chief designers, points out, it would be very helpful if, for example, "when scanning a map for a subway station one could actually hear the sounds of trains running at appropriate points on the map. . ."

All this was foretold in essence more than 15 years ago by I. J. Good with his fantasy in "The Scientist Speculates". Heinemann,* of the dentist working inside his patient's mouth. Where Negroponte breaks new ground, apart from translating fantasy into actual technology, is in seeing this multi-media enhancement of sensory experience as the doorway to new desirable relationships between people and computers and also to new relationships between people and themselves.

The basic idea of the proposed relationship is that it should present only those features which evolutionary and social experience have conditioned us to handle. How do you actually file and retrieve data? Why, says Donelson, by "remembering the letter to your secretary because it was next to the telephone, locating a stack of memos by remembering that you have to stretch out your right arm, or finding a book by noting its proximity to the large red one."

Negroponte envisages man-machine relationships of such intimacy that he asks us to picture such a dialogue as the following, conducted on returning home (presumably to one's loved and loving personal computer) after a long and trying day:

"Okay, where did you hide it?"
"Hide what?"
"You know."
"Where do you think?"
"Oh."

Negroponte's recurrent concern is with human creativity and the deadening effect upon it of conventional computer aided design, likening the latter to talking about Cezanne to a Martian by telegram. He notes that not a single contemporary system attempts to ascertain even whether the user struggling with light-pen and light-buttons is right or left handed, and many a Computer Weekly reader will respond sympathetically to his castigation of the "impoverished and almost sordid nature of keyboards."

A computing system should care enough for the user's idiosyncracies to recognise him by them. He likens such a system to a super-ideal secretary, seen as the first step towards a working environment in which the user can realise his thwarted potential to be truly creative.

I agree. The more my secretary panders to me, the more creatively I begin to behave. By the end of a good day I am inventing quite exotic things of no perceptible use. So she rations her panderings so that these creative outbursts do not in general occur on the firm's time. Probably she has in mind the anecdote of how Leonardo da Vinci devised a mechanical system "consisting of little spoons with which different colours were to be used, thus creating an automatic harmony." One of da Vinci's pupils, after trying in vain to use this system, in despair asked one of his colleagues how the master himself used the invention. The colleagues replied: "The master never uses it at all."

Leonardo, a weekday painter, was a Sunday technologist. His aeroplanes and submarines were never built. The undertaking to divert the river Arno failed. So, one may add, did his project to develop heat-proof paints. His greatness was fulfilled only within the confining structure of his artist's training. Even mankind's greatest genius could not escape Grundy's Law that if the ratio of creativity to hard slog exceeds one part to a thousand, then the mixture is already too rich to generate tangible results.

The system which Negroponte's group is striving to call into existence — with impressive first-class success — belongs to a new species of "Sunday systems". Their role will be to augment those human talents whose exercise belongs to the play-days of the week. Foremost among these talents I place that "being creative." As automation fast makes every day in increasing measure a play-day, I foresee an immense and variegated universe of mass applications. These may even include whatever ritualised gladiatorial games the nations may adopt as substitute for military conflicts made unacceptable by today's hundred megadeath technology.

But what about the work-days? Are not 999 out of every 1,000 of these best passed in studious application to the tens of thousands of tested rules which go to make each given craft?

No need to argue a point which may one day receive the verdict of the marketplace. Let the Negroponte machines of the future be equipped with a "fun button" and a charging algorithm which discriminates between modes. I shall pay for my laboratory's "no fun" use by selling "fun time" to those of my colleagues in danger of taking their work too seriously.

It is only fair to add that under this rubric I shall certainly be hiring a ration of fun time for myself. If my secretary lets me.

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Donald Michie

COGARVIEW

Uncertainties and hazards of satcomms

TEN years ago, every article on teleprocessing in the DP Press always used to begin, "As the cost of communications continues to decrease . . ." It was the accepted wisdom that a revolution in data communications was just around the corner, though on what grounds this was based I don't quite recall. At any rate it never happened. Relative to processing costs, datacomms got more expensive and distributed processing was invented.

With this omen clear in mind I would be mad to suggest that Satellite Business Systems, the joint IBM/Comsat/Aetna Life Venture, amounts to a revolution in telecommunications. But it must be the nearest approach to that era of low cost datacomms that we were looking forward to in the 60s. Even if SBS never actually gets off the ground (no pun intended), IBM and its partners will have done computing a signal service by illuminating the way ahead.

I am fairly confident that SBS itself will get off the ground. Considering the failure of the existing satellite services to address themselves to the real needs of the customers, and considering AT&T's failure to address itself to anything connected with satellite datacomms, it is a bit of special pleading to complain of unfair competition now.

Given the massive database capabilities of the satellite-based networks, could we be, unintentionally, opting out of the fight against organised crime? A satellite-based mob would be virtually impossible to crack.

Whatever the outcome of the present court battles and, no doubt, further endless legal and political wrangles that will attend it, some kind of SBS-type satellite will be in orbit within five to ten years, and probably several of them before the end of the century. I will return to the question of IBM, AT&T and the precise question of SBS in another column. Here I want to make some observations about satellite communications in general.

I have no doubt that the SBS project is technically feasible in the projected time-scale and economically sound. The use of the 14 GHz bandpass; the flexibility of distribution between different kinds of traffic, the low cost, individual earth stations — they are all spot on. But leaving aside the anti-trust and unfair competition questions that have already been raised, the SBS concept raises a host of particularly sensitive political problems which will have to be answered.

To start with, who are going to be the customers for SBS or whatever similar satellite eventually gets into orbit? Well, one thing is clear: they are not going to be small. The Detroit car makers, the aerospace corporations, shipping lines, large land-based transportation companies — the sort of corporations which have a reasonable chance of exploiting the database capabilities that wideband satellite networks open up.

For that is the critical factor about networks. They don't exist simply to increase processing power, and they only coincidentally exist to reduce communications costs. Their basic *raison d'etre* is to make possible the establishment and use of common databases, and on the whole that means that the larger the company the more attractive the satellite-based network is going to be. We are talking about multi-million dollar businesses. Firms that spend at least $5-$10 million a year on computing.

Did I just describe a multinational? I almost certainly did. For corporations of this size rarely confine their operations to their parent country. And if their operations are international, and if their aim is to construct a truly common database, then they are not going to be happy with a network which is confined to their native mainland.

So SBS antennae start sprouting atop IBM, Unilever, Shell, maybe General Motors office blocks all over the world, increasing the already enormous misgivings held by many European and Third World governments about the power of the multinationals. The belief, whether well or ill-founded, that SBS allows the big US corporations to steal a march on local industries, will inevitably lead to more pressure for protectionist policies by national governments. Financially hard-pressed PTTs will complain that they are being robbed of generally lucrative business traffic by the satellite over which they have no control. SBS spokesmen have themselves admitted that the satellite's capacity to handle electronic mail alongside conventional voice and data traffic is one of its biggest attractions.

Another problem: Suppose an SBS customer found itself with spare computer capacity on its hands; there might well be some temptation to hawk it around to European bureau users, exploiting SBS's cheap transmission rates to "dump" computer time from the US. On any scale — and remember that we are talking of giant companies for which a little under-used capacity may amount to a vast resource by European standards — this could drive local bureaux out of business, increasing unemployment among DP professionals, and so forth.

No doubt SBS would talk of safeguards — but what safeguards? They wouldn't even know what was going on and, in all probability, even the suspicion of dumping is enough to create major political platforms in most countries.

The possibility of malign interference by unfriendly characters should also be considered. Bandpasses belong to the world. Any country could easily beam a lot of noise on the selected frequencies, effectively "jamming" the satellite and preventing it from receiving clearly recognisable signals when it was within the range of these countries. Could a concerted campaign, for instance, by countries hostile to satellite customers' trading links put the satellite out of commission for a large part of its orbit? Could terrorists hold a satellite to ransom?

These points are not intended, of course, to be any kind of argument against SBS or its future competitors. The concept is of vast significance to the entire structure of large companies. But they are an indication of the sort of unlikely hurdles which the project will have to clear before it wins ready acceptance. There may be more domestic problems, too.

Users tend to be conditioned to the facilities which they have and sceptical of claims made for new ones. Though I don't doubt SBS's claim that it will be able to improve on today's average data transmission speeds by a factor of 650, I am afraid the very magnitude of the figure may inspire disbelief.

Satellite communications on SBS lines are almost certainly an inevitable development. In 50 years' time we will look back on our misgivings, I hope, with incredulity. In the meantime I leave you with one further disturbing thought.

Given the various kinds of encryption that will form an essential security feature of satcomms and because all the data flowing over the network will be available to all the users on any one wavelength, only that information for which the intended recipient has a key will be intelligible to him. And given the massive database capabilities of the satellite-based network, could we be, unintentionally, opting out of the fight against organised crime? A satellite-based mob would be virtually impossible to crack.

£2.5m orders for ICL 2960

THREE orders, worth about £2.5 million, have been placed by an insurance company, a shipping company and a department store group with ICL for its 2960 computer.

The orders are from Minster Insurance, which is replacing a 1903T; Ocean Transport and Trading, which is replacing a 1903A; and House of Fraser, which is replacing two System 4s.

Network seminars

IN an effort to educate both users and potential users in the implications of computer networks, and as an adjunct to its programme to determine the views of users on the facilities they want, the National Committee on Computer Networks is holding two seminars in London and one in Manchester (CW, October 27).

The first two seminars will be at the Institute of Education, London WC1 on November 30 and at the Kensington Close Hotel, London W8 on December 1, and the third will be at the National Computing Centre in Manchester on December 5.

Each seminar will be from 10.30 to 4.30 and will cover future applications and technology including possible costs; and the Post Office will outline its current plans.

Participants will be asked to respond to the questionnaire which is being sent out to a wide range of potential users.

Attendance is limited to one representative per organisation, and applications, with cheque for £5.40 to include lunch, should be sent to NCCN Seminar Bookings, National Computing Centre, Oxford Road, Manchester M1 7 ED. Telephone (061) 228 6333.

Special terms for UK firms at 1978 NCC

UK companies thinking of taking space at the US National Computer Conference and exhibition in Anaheim, California next summer are offered beneficial terms if they go out under the auspices of the Business Equipment Trade Association and the Department of Industry.

Concessions include up to half the return air fare for one or two people to man the stand, a 15 square metre space plus shell stand, and up to 50% of the sea-freight cost of getting back to the UK equipment which remains unsold at the end of the show.

The show runs from June 5 to 8, and the charge for space is £70 per square metre for registered exhibitors and a concessionary rate of £7.50 for companies taking part in the show under the scheme for the first or second time.

People wanting application forms should telephone BETA Exhibitions Manager John Stevens on 01-405 6233 Ext 4008 as soon as possible.

George Cogar will be the keynote speaker at an Infotech conference on future networks to be held in London from November 14 to 16. Cogar is a unique figure in the computer industry. A high school drop-out at the age of 17, his "workaholic" lifestyle has enabled him to rise from a trainee service engineer to one of the world's leading computer designers. Cogar is already well known to Computer Weekly readers through his monthly Cogarview. In this article, IVAN BERENYI talks to Cogar and fills in some of the background on "the jerk with less than 10 years of formal education who ended up designing computers."

Success story of a school drop-out

"HOW does a jerk with less than 10 years of formal education end up designing computers? I could not even solve a quadratic equation. If I was bright, I certainly did not realise it. I just worked, burning a lot of midnight oil. If I'd worked an ordinary eight-hour day, I would probably have ended up a pretty normal guy."

George Cogar, a self-confessed "workaholic", is one of the key figures in the history of computing. When he calls himself a jerk with less than 10 years' education, he is not indulging in false modesty. Born in West Virginia, he was one of 12 children and a high school drop-out at 17 who drifted like so many others into the military in search of a trade.

In the US Air Force he got a grounding in radar and dabbled in meteorology. He left in 1953 and spent a year as a jobbing electrician, wiring houses and repairing radio and TV sets. Hearing of openings for instructors with electronics experience he got a job at Fort Malmouth army signals school. It was here, six months later, that a lunchtime conversation altered his whole life.

It was originally known as the "bumblebee project" — because of the bumblebee's ability to fly is against the odds of aerodynamics.

"One guy started talking about what he thought was going to be a big new field — computers," Cogar remembers. "He said Univac was hiring people to be customer service engineers. So I called the company up, got an interview, and went to work."

Cogar's rise through the ranks at what was to become Univac was meteoric — not totally uncommon for that period. A few challenging questions in the training class and the young George Cogar found himself across the podium teaching instead of learning.

His subject was printers and peripherals and for the next nine months he taught others how to hang I/O equipment on a machine — the Univac I — about which he knew nothing. Aware of this gap in his knowledge, he spent his spare time teaching himself how the Univac I operated.

During nine months with Remington, Cogar was working at the Philadelphia offices of the company. His next assignment was to St Paul, to develop a course on the Univac II which at the time was thought to be nearing completion.

The technical jealousy that existed between the two arms of the company was at its peak in the mid 50s. The St Paul offices were based on the old Engineering Research Associates company which was strongly oriented towards scientific work; the Philadelphia offices were based on the pioneering work done by Presper Eckert and John Mauchly and had adopted an equally strong commercial approach. Univac I had been built by Philadelphia around what was then conventional technology.

St Paul made a strong bid to be allowed to carry out the development work on Univac II, which was to be a conversion of Univac I to a word-serial, bit-parallel machine with core storage.

"The programme got to St Paul, and they started making this a little faster and then a little different, until finally the whole damn design of the machine had changed," Cogar says.

In the midst of this controversy Cogar found himself in a unique position. He was someone who had not been with the company long enough to get identified with Philadelphia, but he had taught himself the Univac I thoroughly. And in the process of developing his course on the Univac II he had acquired an objective view of the design of that machine which was unparalleled at St Paul. "It was really crazy," he says, "By writing a training course I had ended up with a better understanding of the machine than the people who were trying to build it."

By this time Cogar had already got involved in what was to become his speciality, hardware design. But he was moved to Philadelphia as a result of a chance conversation with Dr Grace Hopper, just a few days after joining a design team at St Paul.

Unsettled by a series of transfers to different groups that kept him almost permanently in the air between St Paul and Philadelphia, he began to feel dissatisfied with his jolly joker lot, he recalls.

In the end he wound up back in Philadelphia, simultaneously advising the Univac II team on manufacturing engineering and with a brief to check the logic of the Lark scientific programme, already 18 months behind schedule. His review of Lark uncovered design flaws in the basic circuit family and in the architecture of the central mathematical unit, news of which found its way through the grapevine to Philco. In 1958, at the age of 26, frustrated by lack of job satisfaction and left stranded by a new pay structure which emphasised qualifications and years spent with the company at the expense of ability and experience, Cogar left Remington after a lot of soul searching to join Philco as a logic designer.

"About the third day I was there, I walked through the lab trying to find a coffee machine, and I ran into a guy who was working with tape drives brought in from Ampex and had a problem testing them, so I made some suggestions as to how he could do it, and that afternoon the guy came back with his boss and he asked me if I could take over the magnetic subsystem programme for the Transac (later Philco) 2000 super computer, then under development for use in nuclear research. So my logic design experience at Philco was brief indeed."

But within a year Cogar sensed that Philco was not fully committed to stay in the computer industry (the company opted out of hardware production within a couple of years) and stayed on for only 18 months. Then Univac invited him back to head the team working on logic and systems design for the Univac III.

Although Cogar today refutes the common assumption that he was the single-handed designer of the Univac III, he will admit that he did "an awful lot of design work" himself.

The Univac III led directly to Cogar's last and perhaps most significant project for Univac — the 1004. It was not called that when Cogar joined the development team in mid-1961.

It was originally known as the "bumblebee project" (because the bumblebee's ability to fly is against the odds of aerodynamics), and then as the "barn project" because of the rustic secrecy in which it was shrouded in a disused barn at a remote Connecticut location. The brief was simple — to provide Univac with a viable competitor to IBM's 407 tabulator, which had eroded Remington's powerful tabulator base.

Cogar, who had never set eyes on either a 407 or Remington's staple, the Model 3, was told bluntly by the head of engineering, "We have to have a tabulator and we have to have it within a year." He admits he had doubts about being able to carry out the task. "I told the head of engineering and manufacturing that I'd do it if I could do it in an isolated location, if I could pick my own people — and if I could have guards on the door to keep out critics," he recalls.

The need for guards was to become very evident. "Any number of people tried to kill the 1004," says Cogar. "Despite my resolve to keep critics out, we had to let various people in so that the project could keep going. I remember Pres Eckert going through the roof when he found out we were using a plugboard. He thought it was a step back into the dark ages. But user experience was in plugboards, not in software."

The Cogar team had a fully-blown, pre-production machine in operation by June, and in August the 1004 was ready for production.

The end of the 1004 project was also the end of Cogar's patience with Univac, especially when he sensed that the next project he was to work on, the design of a compatible range, would never be actually manufactured for reasons of internal politics.

Indeed, initial specs were completed, but the project did not get beyond that stage. In the meantime, Cogar was holding secret meetings with fellow-Univac employees Dick Rifenberg and Ed Johnson on the subject of forming a manufacturing company of their own. There were three such meetings in the ensuing months, and ideas sketched out on paper napkins in motel restaurants were to take shape as the company that became known as Mohawk Data Systems.

But it is characteristic of Cogar's career that in those early days MDS was intended to be a mainframe company. It only pioneered key-to-tape data entry by accident.

"Dick's and Ed's idea was to build a mainframe about four times as powerful as the 1401, banking on IBM being late with the 360, and I was prepared to design such a machine.

"But shortly after we got started we became associated with a brokerage firm from Chicago which upon reviewing our plans said that we were whistling in the dark — undercapitalised and with no hope of raising the money before we had something to show investors. So I said, well look, there are going to be a whole lot of 360s out there and a shortage of keypunches, so let's build a machine that records directly on to magtape. So we scrapped the old plans, concentrated on the new idea, and had a machine running within three months."

Univac did not take kindly to the loss of Cogar, nor to the chaotic publicity that surrounded the exodus of Johnson and his management team from its Utica facility. In a discussion with senior Univac management Cogar was told that Harry F. Vickers, former chairman of Sperry, was determined to make up for the inaction that followed the departure of Bill Norris, Seymour Cray and others to form CDC, and would use any means to sue this time.

Thus the birth pangs of MDS were made more painful by a lawsuit, which culminated in the exposure of papers relating to proprietary rights.

The matter was settled out of court, and the seepage of top Univac people into their own businesses was to continue — hence the reference so often made jokingly in industry circles to the "Univac Academy".

Cogar stayed with MDS for three years, breaking with the firm reluctantly as a result of personality clashes among the partners.

As far as the public is concerned, that rift with MDS was where the Cogar Corporation was born. But Cogar, who was the first chairman of Data General (having provided the initial seed money for its founding), and also chairman of Computel, Canada's first time sharing bureau (posts he was to rescind to avoid a conflict of interests later), had no intention of forming his own company at that point.

"I did think of starting a small consultancy or development group, and in fact I did some consulting for some DP products manufacturers," he reflects.

One of his consulting assignments led to a joint development project, and eventually to the setting up of the Cogar Corp in Utica, where the Systems Division manufactured the world's first intelligent terminal, the Cogar 4 (later the Singer 1500 range), and in Wappinger Falls, where the Technology Division's $28 million semiconductor memory plant was located.

The rest of Cogar's career has been chronicled in, what he sometimes feels, embarrassing depth in the DP and business press both in the US and in Europe. The Cogar Corp's liquidity crisis, the Singer takeover, Cogar's presidency of Singer Business Machines, Singer's own decision to withdraw from the computer industry (CW, January 1, 1976) — it is all public property.

Today George Cogar remains a vice-president of The Singer Company, responsible for winding down the affairs of the Business Machines subsidiary (now absorbed by ICL and TRW) and for other duties for the chairman's office.

Although his career has been marked by some notable ups and downs, Cogar has no regrets. "I don't have any bad feelings about Univac or MDS," he says. Regarding the Singer debacle, his comment is laconic: "I came in to manage a business, and ended up managing the disposal of a business."

Cogar prefers to look at the future, though his own future has by no means been firmly mapped out yet. His interests are widespread — he is trustee of a college in upstate New York and a passionate outdoorsman, and is involved in a variety of business ventures, most of which have to do with technological progress.

The versatile digital cassette

This hydraulically-operated robot spray gun system is controlled by three digital cassette recorders.

WHEN the now familiar audio compact cassette was introduced in 1963, it was only natural that many people working in computing and with other digital equipment eyed the cassette as a potential handy digital storage medium. Perhaps the potential was only too obvious. Many fanufacturers tried to jump on the bandwagon, often without being able to provide adequate product or service support. Not surprisingly, quite a few problems resulted.

By 1970 two things were crystal clear. One was that the digital cassette certainly had a very broad role to play in a wide variety of digital equipment. But, at the same time, it was also obvious that effective standardisation of the digital cassette and its recording format was urgently required, particularly to ensure data interchange between computers of different origin.

So, in January, 1970, work started under the auspices of the European Computer Manufacturers Association to identify and standardise the physical properties and the relevant data format of a magnetic tape cassette for digital applications.

The first standard ECMA-34, which was issued in September 1971, was presented to a committee of the International Standards Organisation as a proposed draft for an international standard. Similar work at the American National Standard Institute was also in progress and, as a result of the ECMA and ANSI activities, a final draft for an international standard was adopted by ISO in April, 1973. With contents identical to the future ISO standard, a second edition of the ECMA-34 standard was adopted by the Association in June 1973.

With effective standardisation achieved by ECMA, ANSI and ISO, the potential of the digital cassette could be fully achieved. Adverse reactions, occasioned by the low quality, unreliability and unsupported products which had appeared before standardisation, largely disappeared.

Digital cassette recording rapidly became established as the most convenient and prominent economic input/output medium. Reliability of digital cassette recorder products built to the new standards met the demanded levels. Interchange of data between different machines incorporating digital cassette drives became secure.

Robustness and ease of handling, labelling, filing and transport are all cassette strong points. Handling is limited to loading and unloading performed within seconds. Storage capacity is equivalent to six large rolls of punched paper tape and, in contrast, it can be filed away in a small space.

Another virtue is economy: cost per bit of stored data is low, particularly where considerable new data is being generated. Capacity of the digital cassette is near-ideal for many applications: adequate to store considerable data, without excessive capacity which would often remain unused.

Naturally, other small magnetic data storage media such as floppy discs and disc cartridges have been developed since the digital cassette pioneered the market. In certain application areas, the later developments have strong points, just as the digital cassette has those cited above. For instance, the digital cassette is ideal for recording serial data; on the other hand, random access is not a cassette strong point. Although random access certainly is feasible with a digital cassette, it can be achieved more rapidly with other systems. The message is that all the media have a strong future, each in the areas where its virtues are particularly relevant. But the digital cassette is likely to continue to be the lowest priced medium.

To illustrate the scope of the digital cassette it is useful to outline the present functions performed by the digital cassette recorder and the areas where it is applied. Its functions may be simply defined as data input/output, program input/output and intermediate storage. Thus the whole field of data capture is open to digital cassettes. In fact, even though hundreds of thousands of digital cassette recorders are already in operation around the world, the application areas will increase as more tasks and operations are automated.

At present, applications may be divided into several broad groups: business data processing; industrial and scientific applications; data terminals; special purpose terminals; word processing; and, covering several application areas, the rapidly expanding sphere of microprocessor-based systems.

Probably the most familiar digital cassette recorder applications are those in small administrative and accounting data processing systems. Mostly used for program loading and as input/ouput storage devices, single and multiple digital cassette recorders are incorporated in many small business computers, visual record computers, programmable desk-top calculators and similar products.

Less obvious, but very numerous, are the diverse industrial and scientific applications for digital cassette recorders. Although input/output storage and program loading are, once again, the principal functions performed by the digital cassette recorders, the applications of the systems in which the recorders are incorporated are extremely varied.

Most common are machine and process control systems incorporating mini and microcomputers. Industrial robots for mechanical handling, and for hazardous operations in adverse environments, are frequently controlled by programs recorded on digital cassettes. Memory functions for theatre and television studio lighting, printed-circuit board automatic test procedures, telephone exchange program loading and diagnostic operations are performed similarly.

Among other functions are logging of traffic on telephone lines: recording of data in flexible working-time systems; collection and storing of patient data for screening purposes in hospitals; recording radar data and other information essential for safe airfield and air traffic movements; logging of ticket printer output; road traffic control data logging; and keeping records of water, energy and other supplies. Data collection products for ecological and meteorological studies also frequently incorporate digital cassette recorders.

From the first tape-oriented systems where digital cassettes replaced paper tape, usage of digital cassette drives has advanced so that many data terminals now incorporate digital cassette recorders. These include intelligent terminals which may be user programmable, stand-alone units of clustered systems. Printers and video display units may incorporate digital cassette recorders, as may a wide variety of special-purpose machines such as bank-teller units, industrial data collection systems, portable inventory/stock control units and medical terminals. A prominent application area is point-of-sale terminals along with the related field of electronic cash registers.

Holiday for two

Prizes for the Philips/Computer Weekly digital cassette recorder competition are two expenses-paid trips from UK to Holland next spring.

Prizes will be awarded in two categories: one for general entrants and one for students at a recognised institution of higher education. Entrants must submit ideas for new DCR applications.

Each prize will consist of a three-day weekend return holiday for two from the UK to Holland, hotel accommodation, and accompanied visits to Amsterdam, the famous bulbfields and other attractions.

Closing date is February 28, 1978.

All entries must be accompanied by an official application form, with up to five entries allowed for each person.

For entry forms write to Philips/Computer Weekly DCR competition, Digital Recording — G 102, MEL, Manor Royal, Crawley, Sussex.

Appointments

LONDON Derek Blakemore 01-261 8454

FURTHER APPOINTMENTS APPEAR ON PAGES 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63

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PROGRAMMER £4.4K. Cobol installation moving to distributed processing and on line systems. 2 years' experience minimum. Age 23+ preferred.

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MANCHESTER

PROGRAMMER to £4.4K. Cobol or Plan. 2 yrs. experience. Will need to assist in training programmers and enjoy user contact.

JUNIOR PROGRAMMER £3K. Any language considered, providing 6-12 months' general programming experience.

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CSIRO

AUSTRALIA

DIVISION OF COMPUTING RESEARCH CSIRONET BRANCH

BRANCH HEAD (DESIGNATE) R&D GROUP LEADERS RESEARCH SCIENTISTS

(5 POSITIONS)

CSIRO has a broad charter for research into primary and secondary industry areas. The Organization has approximately 7,000 employees — 2,200 of whom are research and professional scientists — located in Divisions and Sections throughout Australia.

FIELDS:
Graphics
Programming Methods
Numerical Analysis
Distributed Data Base Systems
Operating Systems

GENERAL: The Division of Computing Research carries the responsibility for CSIRONET — a 70 Node packet switching network which provides access from about 200 file input/output devices and more than 400 interactive devices to host computers. The principal host is a maximum configuration Cyber 76 mainframe, supported by 5,000 million characters of on-line storage, tape units and by PDP11 control stations and network interface processors. A COMp80 camera output device is on-line to one control station. A number of other host machines, including a large PDP11-70 configuration, are used for R & D purposes. Negotiations are currently in hand for the supply of additional host machines to complement the utility. The network, network interface to host, and station software have been developed by the Division. The CSIRONET Branch includes R & D, Operations and Service Groups and comprises about 90 staff.

DUTIES: The present branch head (an Assistant Chief of the Division) will retire within twelve months. The Branch Head (Designate), to be located in Canberra, is expected to play a major role in restructuring the Branch, which will include an increased number of R & D groups located in Canberra, Melbourne, Sydney, Brisbane and Adelaide. Each group will comprise 5-3 staff including research scientists and professional and technical staff. In addition to original work, the groups are expected to develop and maintain software, and to prepare and disseminate documentation to special interest users' groups and to the 2,000 users of CSIRONET. Some group leaders would be required to accept the additional responsibility for the interface between CSIRONET and users in a region. Administrative assistance is, of course, provided. The Research Scientists would be part of a team engaged in the development and maintenance of software for the host and support computers. They would need the ability to undertake original and major development projects without detailed supervision.

QUALIFICATIONS:

Research Scientist:
A Ph D degree (or equivalent) in computer science. Previous experience in the relevant field is essential. Salary in the range of Research Scientist or Senior Research Scientist: $A14,292-$A20,822 p.a.

Section Leader:
In addition to the qualifications for research scientist, extensive experience and publication in the relevant field is essential together with some previous experience in the management of a small section. Salary in the range of Senior Research Scientist or Principal Research Scientist: $A18,171-$A24,528 p.a.

Branch Head (Designate):
In addition to the qualifications for section leader the Branch Head (Designate) is expected to have an international reputation in some branch of computer science and to have extensive experience in the management of computer systems development. Salary in the range of Senior Principal Research Scientist to Chief Research Scientist Grade 1: $A25,857-$29,239 p.a.

Tenure:
Indefinite or fixed term appointment may be negotiated. Both carry superannuation benefits.

Applications (in duplicate), stating **FULL** personal and professional details, the names and addresses of at least two professional referees, and quoting reference number **800/321**, should reach **The Personnel Officer, Australian Scientific Liaison Office, Canberra House, Maltravers Street, LONDON WC2R 3EH, by 31st December, 1977.**

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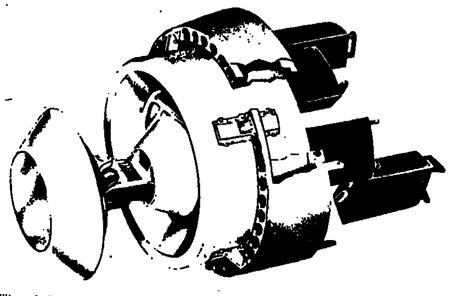

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or send brief personal details to:

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Marconi-Elliott Avionic Systems Ltd.
Elstree Way, Borehamwood, Herts.
Quote reference MEA 7004

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SENIOR SYSTEMS ANALYST responsible to Group D.P.M. at least two years production planning and control systems + a formal programming background in COBOL and RPG experience of small mainframes or ICL 2903 and terminals required. Area Worcestershire. Salary to £5.7k. Ref. SA99

SYSTEMS ADVISOR required by mini/terminal manufacturer. At least three years on mini or mainframe systems. Area Birmingham. Salary to £5.5k. Ref. P180.

SENIOR SYSTEMS ANALYST at least four years in commercial systems including accounting and on-line applications. Area Coventry. Salary c. £5k. Ref SA024.

SYSTEMS MANAGER

Degree or professional qualification in engineering required. At least 4 years working on engineer/production systems. Familiar working with terminals. Area West Midlands. Salary to 6k. Ref. M12.

SENIOR SYSTEMS ANALYST, must be experienced in production control applications. Area Leicester. Salary c. £5,500. Ref. SA 66.

SYSTEMS ANALYST required by manufacturer to give technical support to their salesman and client staff. At least on commercial programming/ systems applications. Area Birmingham. Salary c. £5,250 + car allowance.

SUPPORT ANALYST for management services department, three years plus Systems Analysis with a knowledge of CICS or IMS, area Birmingham. Salary c. £4,500.

SYSTEMS ANALYST, three years' + experience in commercial systems. Area Derby. Salary £4,500.

SENIOR O AND M OFFICER, 3 years' + experience in O & M especially manufacturing systems. Area Gloucester. Salary to £5.5K. Ref. SA 77.

SYSTEMS ANALYST, at least three years' experience in commercial systems knowledge of George 3 or OS an advantage. Area Northampton. Salary £4K-£6K.

SYSTEMS DESIGNER, two years' + experience in systems design, area Gloucestershire. Salary to £4.9K.

SYSTEMS ANALYST, five years' plus commercial business systems insurance or banking background preferred. Salary c. £6k + low mortgage scheme.

SENIOR SYSTEMS ANALYST, five years' + experience in commercial systems, area Bristol. Salary to £6 k.

SENIOR SYSTEMS ANALYST, five years' experience in BATCH Systems, area Swindon Salary to £6K.

SYSTEMS ANALYST, three years' + experience in commercial systems, area Burton-on-Trent. Salary £4k-£6k.

ANALYST/PROGRAMMER, at least two years' + expenance in RPG II, area Cotswolds. Salary to £4.5k.

PROGRAMMER ANALYST, two years + COBOL for recently installed Honeywell installation. Area Birmingham. Salary to £4.6k.

SYSTEMS ANALYST at least five years in D.P. including two years + systems Analysis, area Loughborough. Salary neg.

PROGRAMMERS

CONSULTANT/PROGRAMMER/ANALYST, for time sharing bureau. Applicants should have a degree plus a working knowledge A.P.L. Area Midlands or London. Salary to £5+k and car. Ref. S008.

PROGRAMMER, two years' + experience ICL COBOL, including MAXIMOP. Area Birmingham. Salary to £4k.

PROGRAMMERS, 2 years' + experience in either COBOL or PL1. area Swindon. Salary to £6k.

SENIOR PROGRAMMER, at least 18 months' + experience in A.N.F. COBOL, with a knowledge of Assembler or RPG II and conversant with DOS JCL. Area Northampton. Salary to £5.4k.

SYSTEMS PROGRAMMER, experienced on Datapoint, mini for new development work. Area Birmingham. Salary £5.8k.

PROGRAMMER, 2 years' + COBOL, able to work on own initiative. Area Leicestershire. Salary to £3.5k.

SENIOR PROGRAMMER, three years + COBOL, area West Birmingham. Salary to £4.3k.

TWO PROGRAMMERS. 1 applications and 1 software, 2 years' + experience, area Bristol. Salary c. £4,000.

PROGRAMMER, 1 year + ICL COBOL, area Northampton. Salary c. £3,000 + low interest rates.

PROGRAMMERS, 18 months' + COBOL or PL1, area Burton-on-Trent. Salary to £4k.

PROGRAMMER, three years' + in commercial applications. Any languages to work for a firm of business consultants. Area Birmingham. Salary to £6k.

PROGRAMMING. 18 months' + experience in PL1 or would consider COBOL or Assembler Programmer for training in PL1. Area Birmingham. Salary £5.5k-£4.5k.

PROGRAMMER, 1 year + ASSEMBLER with CICS or Teleprocessing experience. Area Birmingham. Salary to £4k.

SENIOR PROGRAMMER, 2 years + ICL COBOL. Area Loughborough. Salary Neg.

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OPERATORS, 18 months' + experience on IBM 370 OS or terminal equipment, area Birmingham. Salary to £4k.

OPERATOR, one year + experience, area West Birmingham. Salary to £3.5k.

SENIOR COMPUTER OPERATOR, three years' plus experience on any hardware, age 24 years + double day shifts. Area Birmingham. Salary to £3.5k.

COMPUTER OPERATOR, 18 months' plus experience ICL 1900, area Leicestershire. Salary c. £3,000.

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POSITION	SALARY	EMPLOYER	LOCATION	HARDWARE ENVIRONMENT	SOME OF THE QUALIFICATIONS	REF. NO.
IMS Applications Programmers	c. £16,000	Software House	Holland	IBM 370/OS	Sound COBOL with good IMS applications programming experience. DB essential. DC added advantage.	
Systems Designers	to £6,500	Financial Institution	North London/ Herts	IBM 370/OS	For Application development. At least 2 years' experience on IBM hardware with PL/1 and BAL.	45/2
Senior Analyst	c. £6,000	National Institution	S.W. London	ICL 1900	3 years' systems experience. Preferably with some programming. Capable of working with minimum supervision.	45/3
Senior O & M Analyst	Minimum £6,000 & Benefits	U.S. Oil Co.	S.W. London	IBM 370/OS & PDP 11	Petrochemical group seek a top O&M person who is presently earning c. £6,000. High responsibility goes with this job.	45/4
Programmer/ Analysts	£5,000 + Mortgage	Banking	City	System 3 System 32	Sound RPG II programming experience. Preferably on System 3 or System 32. Any Banking background an added advantage.	45/5
RPG II Programmers/ Analyst/Progs	c. £5,500 + Travel exp.	Software House	London & South	ICL 2903 IBM System 3	Travelling in and around London on Commercial Projects. Opportunities for advancement.	45/6
Compiler Development Programmer	£8,000 + Car	Computer Manufacturer	West Middx.	Minis	Sound Assembler experience. Compiler background essential, any basic knowledge of COBOL an added advantage.	45/7
Analyst Programmers	£12,000 + Accommodation	International Airline	Middle East	IBM OS	Very exciting opportunity for person with Inventory Control experience.	45/8
PL/1 IMS Analysts & Programmers	Negotiable but High	Management Services Facility	South Coast	IBM 370/OS	Ideal locality with first-class job interest and opportunity to develop into IMS and data base development.	45/9
Message Switching	Minimum £12,000 & Accommodation	Communications	London or Gulf States	PDP 11	Major British Company active throughout Gulf States requires exp. Message/Packet Switching people.	45/10
Mini Analyst Programmer	c. £11,000 + Tax Allowance	International Systems & Software Group	Benelux	D.G. Interdata PDP etc.	Mini Software specialists and Communications/Message Switching exp. urgently required.	45/11
IBM COBOL Programmer	c. £4,900 + Mortgage	Insurance	East Surrey	IBM 370/DOS/VS	One of the major Insurance Companies. Plenty of scope to develop career. COBOL is essential.	45/12
Team Leader	c. £6,200	Major Manufacturing Group	N.W. London	ICL 1900/2900	Plan and or COBOL in an ICL environment essential. Important post with development potential.	45/13
PL/1 or COBOL Snr. Analyst Programmer	£10,000- £14,000	International Systems and Bureau Group	Germany & Belgium	IBM 370/OS & System 4	Foremost Systems and Bureau Group. PL/1 and or COBOL under OS essential. Foreign language required for some posts.	45/14
BAL Snr. Systems Programmer	c. £4,750 + Mortgage	Insurance	City	IBM 370/DOS/VS CICS	Min. 2 yrs. BAL and 1 yr. DOS/VS SYSGENs. Higher education an advantage, any exposure to CICS desirable.	45/15
PL/1 Applications Programmer	c. £5,000 + Mortgage	International Banking Corporation	East London & City	IBM 370/OS CICS & IMS	Sound PL/1 exp. essential: any exposure to CICS or IMS will be an advantage. Training given.	45/16
Assembler and PL/1 Programmers	c. £6,750 + O'seas Allowance	Software House	UK or Europe	Series 1 & 370/OS	Ground floor opportunity to establish expertise with IBM's new series 1 computer. Excellent Overseas conditions.	43/17
Snr. Programmers	Contract £160 p.w.	Software House	Central London	ICL 1900 & 2900	Immediate long and short term contracts for Plan and COBOL experience. Excellent rates for those with exposure to CICS and or DL/1.	45/18

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This is an ideal opportunity to develop skills in on-line applications in which thorough training will be given to successful candidates. Interviews will be held during the 2nd two weeks of November in Croydon and appointments will be made within 1 week of interview.

Ref. 45/19.

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The successful applicant will be in his/her mid-twenties and have a good honours degree in engineering, science and computing. Experience in one or more of the fields of modern control theory, plant modelling and digital computing or on-line real-time computing would be an advantage though not essential. Of more importance is being able to demonstrate an aptitude for problem solving across a range of engineering disciplines. This will require a keen mind, enthusiasm and initiative. The successful candidate will be given the required in-post training in the fields where he/she has no direct experience.
The post will be based at the new Laboratories at Bedminster Down, Bristol, but will be located at Portishead until early 1978.
Applications on Form AF/1 obtainable by phoning Bristol 32251 Extension 18 or by writing to the Personnel Manager, should be completed and returned to him quoting Vacancy Notice No. 348/77/CW, by not later than 21st November, 1977.

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Closing date: Friday, November 26, 1977.

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Our client, a major U.K. company, can offer you real career opportunities for advancement into project management. If you can keep pace with them they can offer you rapid progress to take over individual projects of commercial application.

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BRISTOL (0272) 211035 — Equity and Law Building, 46-48 Baldwin St, BS1 1PR
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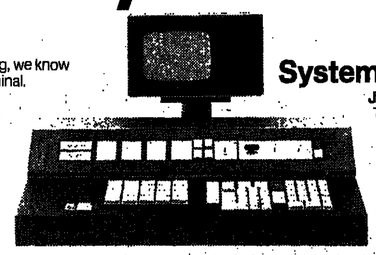

Within the competitive area of distributed processing, we know we're on to a winner with the TC 800 intelligent terminal. Worldwide sales in the commercial and financial markets have already confirmed this. But we realise that, in order to do justice to the capabilities of such an outstanding product, software systems of exceptional quality need to be designed and implemented. So it's important to us that we reinforce the present high standards of our professional support team by making the following appointments in Central London.

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Experience of the financial or commercial market place with a minimum of 3 years' experience in systems analysis in the minicomputer environment. The ability to handle projects and prepare sound systems specifications. Experience of communications would be a definite advantage.

The Person
At least 2 years' thorough knowledge of Assembler language, with a knowledge of IBM 370 communications an advantage; thorough but practical technical programmers.

We also have one or two vacancies for less experienced people in the same job roles.

We offer an attractive remuneration package, including an interest-free car loan, pension and assurance scheme.

Write with full career details, or phone for an application form to:
Murray Fraser, Regional Personnel Manager, British Olivetti Limited,
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Tel: Milton Keynes (0908) 71155.

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